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Department of Energy

Ohio Field Office
Fernald Area Office
P. O. Box 538705
Cincinnati, Ohio 45253-8705
(513) 648-3155

APR 14 1997

DOE-0805-97

Mr. James A. Saric, Remedial Project Director
U.S. Environmental Protection Agency
Region V-SRF-5J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Mr. Tom Schneider, Project Manager
Ohio Environmental Protection Agency
401 East 5th Street
Dayton, Ohio 45402-2911

Dear Mr. Saric and Mr. Schneider:

TRANSMITTAL OF THE AREA 1, PHASE I PROJECT SPECIFIC PLAN FOR THE ON-SITE DISPOSAL FACILITY SUPPORT AREAS CERTIFICATION

The purpose of this letter is to formally transmit the Area 1, Phase I (A1PI) Project Specific Plan (PSP) for the certification of the On-Site Disposal Facility (OSDF) Support Areas and also lay out the strategy which will be followed to address all outstanding Environmental Protection Agency (EPA) comments which have been received on either the Project Specific Plans for sampling and analyses or the A1PI draft final Remedial Action Work Plan (RAWP). The subject PSP was informally presented and discussed on March 5, 1997, in Chicago with the U.S. Environmental Protection Agency (U.S. EPA) representatives and on March 7, 1997, in Dayton with the Ohio Environmental Protection Agency (OEPA) representatives. Additional copies of the Support Areas PSP were also provided for review at these times. As you are aware, due to the time-critical nature of the A1PI activities, Fernald Environmental Management Project (FEMP) representatives also outlined plans at these meetings to proceed with the remaining sample collection efforts in A1PI (primarily associated with the Support Areas), recognizing that any comments or concerns raised by either the U.S. EPA or OEPA would be resolved in parallel with the completion of the final stages of the certification sampling efforts in A1PI.

By all accounts, the A1PI certification sampling process has been lengthy and difficult. Not withstanding these difficulties, the A1PI efforts have, however, been a learning experience and, perhaps, a necessary step in the ultimate development of a certification strategy for

the FEMP which is both technically sound and not overly complex. In order to satisfactorily complete A1PI certification and ensure that all the U.S. EPA and OEPA comments concerning the certification sampling activities in A1PI are appropriately addressed and/or responded to, the draft certification report will be included with a comment response document addressing all outstanding EPA comments.

The A1PI Remedial Action Work Plan (RAWP) was initially submitted to the U.S. EPA and OEPA in draft on July 17, 1996. Comments on the draft A1PI work plan were received from the U.S. EPA on August 29, 1996, and from the OEPA on September 6, 1996. Due to the number and complexity of the comments received, the Department of Energy (DOE) requested and received EPA approval to initially submit a detailed Response To Comment (RTC) document addressing all EPA comments on the draft work plan submittal. The RTC document was submitted to the U.S. EPA and OEPA on October 9, 1996. Draft A1PI Project Specific Plans and Procedures were submitted to the U.S. EPA and OEPA on October 30, 1996. On November 1, 1996, OEPA comments on A1PI work plan RTC document were received (U.S. EPA did not have any comments on the A1PI work plan RTC document). The draft final A1PI work plan was submitted to the U.S. EPA and OEPA on December 9, 1996. On January 7, 1997, and January 16, 1997, respectively, the OEPA and U.S. EPA comments were received on the draft submittal of the A1PI Project Specific Plans and Procedures for Certification. Finally, on February 4, 1997, and February 10, 1997, respectively, U.S. EPA and OEPA comments were received on the draft final A1PI work plan. The subject comment response document which will accompany the A1PI Certification Report will address those EPA comments which have not been responded to through previous submittals, which would include (1) EPA comments on the A1PI Project Specific Plans and Procedures and (2) the draft final A1PI work plan. Although this comment response document will track all comments from items (1) and (2) above, responses will only be provided for those comments which impact the A1PI certification work; conversely, comments dealing with programmatic issues, such as implementation of the uranium As Low As Reasonably Achievable (ALARA) level will be addressed in the Site-wide Excavation Plan (SEP) and responded to in an accompanying comment response document which will be provided with the SEP.

On March 26, 1997, in Chicago, FEMP representatives briefed the U.S. EPA and OEPA representatives on the latest status of the A1PI sampling and analysis efforts. Furthermore, on April 4, 1997, several three-ring binders containing partial A1PI certification results were provided to the U.S. EPA and OEPA in order to better facilitate the tracking of A1PI Certification Unit completions. It is the FEMP's intent to keep the U.S. EPA and OEPA up-to-date on all A1PI certification efforts through either weekly conference calls and/or updates to the certification binders.

If you should have any questions, please contact Robert Janke at (513) 648-3124.

Sincerely,

Johnny W. Reising
Fernald Remedial Action
Project Manager

FEMP:R.J. Janke

cc:

N. Hallein, EM-42/CLOV
G. Jablonowski, USEPA-V, 5HRE-8J
R. Beaumier, TPSS/DERR, OEPA-Columbus
M. Rochotte, OEPA-Columbus
T. Schneider, OEPA-Dayton (total of 3 copies of enc.)
F. Bell, ATSDR
D. S. Ward, GeoTrans
R. Vandegrift, ODOH
R. Geiger, PRC
D. Carr, FDF/9
T. Hagen, FDF/65-2
J. Harmon, FDF/90
C. Little, FDF/2
AR Coordinator/78
EDC, FDF/52-7

APPROVED VARIANCES TO PROJECT SPECIFIC PLAN FOR OSDF SUPPORT AREAS CERTIFICATION SAMPLING

Project Number 50.03.40.01

Revision 0

March 4, 1997

Prepared by
Fluor Daniel Fernald
for
U.S. Department of Energy
Fernald Field Office

Under Contract DE-AC05-92OR21972

VARIANCE / FIELD CHANGE NOTICE

V/F50.03.40.01-2

S NO.: 50.03.40.01

Page 1 of 1

PROJECT TITLE: OSDF Support Areas Certification Sampling

Date: 3/6/97

VARIANCE / FIELD CHANGE NOTICE (Include justification):

Field Change Notice:

The PSP specifies that one 4" certification interval be collected from the native clay soil for all sample locations identified in the PSP (North Access Road, OSDF Sediment Basin, Sediment Trap, and Pump Station. An additional 4" interval will now be collected immediately below the certification interval as an archive.

Justification:

The second certification interval will be anlyzed if preliminary analysis of the certification interval soils indicates a potential need to excavate the in-place soils corresponding to that certification interval. Having the next interval ready to send for analysis will save valuable time by not having to remobilize the field and collect the samples.

REQUESTED BY: Joan White Date: 3/3/97

X IF REQD	VARIANCE/FCN APPROVAL	DATE	X IF REQD	VARIANCE/FCN APPROVAL	DATE
X	QUALITY ASSURANCE	3/7/97	X	PROJECT MANAGER	3/7/97
	DATA QUALITY MANAGEMENT		X	FIELD MANAGER	3-7-97
	ANALYTICAL CUSTOMER SUPPORT			OTHER	
	OTHER			OTHER	

VARIANCE/FCN APPROVED [X]YES [ ]NO

REVISION REQUIRED: [ ]YES [x]NO

DISTRIBUTION

PROJECT MANAGER:	DOCUMENT CONTROL: Michelle Tudor	OTHER:
QUALITY ASSURANCE:	OTHER:	OTHER:
FIELD MANAGER:	OTHER:	OTHER:

000005

VARIANCE / FIELD CHANGE NOTICE

V/F50.03.40.01-4

WBS NO.: 50.03.40.01

Page 1 of 3

PROJECT TITLE: OSDF Support Areas Certification Sampling PSP Rev. 0 Amd

Date: 3/7/97

VARIANCE / FIELD CHANGE NOTICE (Include justification):

Field Change Notice:

This variance is to remove the suffix "V" (Archive) from the Station Number in the sample tables shown in Appendix B of the OSDF Support Areas Project Specific Plan.

Justification:

The OSDF Support Areas Project Specific Plan calls for one rad certification and one metal certification sample to be taken from each of the 16 sub CUs in the CU. This is a different approach than what was used in the Area 1, Phase I PSP, where 12 rads and 9 metals were archived per CU. These archives were indicated with a suffix "V" on the end of the Station number.

Because the approach (described above) was being changed late in the development of the OSDF Support Areas PSP, the text was changed however the tables were not completely changed. The number of samples to be collected for analysis were increased to 16 rads and 16 metals per CU but the suffix "V" was not always removed from the Station Number. On the samples tables for the Pump Station, OSDF Sediment Basin, Sediment Trap #1, and for one sample on the North Access Road table, although the correct number of samples to be collected and analyzed is indicated (16 rads and 16 metals) some of the samples still bear the suffix "V" which means "archive".

A simple removal of the suffix "V" from the Station Number will remove the identification of "archive" from the sample. This change will need to be made in the Soils Master List database so the samples can be matched up when they return from analysis.

REQUESTED BY: Joan White Date: 3/3/97

X IF REQD	VARIANCE/FCN APPROVAL	DATE	X IF REQD	VARIANCE/FCN APPROVAL	DATE
X	QUALITY ASSURANCE	3/7/97	X	PROJECT MANAGER	3/7/97
	DATA QUALITY MANAGEMENT		X	FIELD MANAGER	3-7-97
	ANALYTICAL CUSTOMER SUPPORT			OTHER	
	OTHER			OTHER	

VARIANCE/FCN APPROVED [X]YES [ ]NO

REVISION REQUIRED: [ ]YES [x]NO

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PROJECT MANAGER:	DOCUMENT CONTROL: Michelle Tudor	OTHER:
QUALITY ASSURANCE:	OTHER:	OTHER:
FIELD MANAGER:	OTHER:	OTHER:

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000006

VARIANCE / FIELD CHANGE NOTICE

V/F50.03.40.01-5
68
Page 1 of 1

WBS NO.: 50.03.40.01

PROJECT TITLE: OSDF Support Areas Certification Sampling PSP REV. 0

Date: 3/7/97

VARIANCE / FIELD CHANGE NOTICE (Include justification):

Field Change Notice:

This variance is to instruct field personel to add Table 3-3 to certification sampling for North Access Road Sampling (Sec 3.1.2), East and West Ditches (Sec. 3.1.6), Sediment Basin Sampling (Sec. 3.2.2), and Sediment Trap #1 (Sec 3.3.2). The requested analysis now corresponds to TAL A1P1-C. Table 3-2 was already required for the Pump Station (Sec 3.4.2).

This action will now include Cs-137 and Th-230 in the requested analysis list.

Justification:

The project lead has determined this additional data will be used for informational and technical purposes to evaluate these isotopic results in case there is an uncertianty associated with the primary COC data.

Since the lab task orders require the Cs-137 and Th-230 for the Pump Station ceritification sampling, these anaylte will be reported inherently as part of the lab data packages.

REQUESTED BY: Joan White JTW Date: 3/7/97

X IF REQD	VARIANCE/FCN APPROVAL	DATE	X IF REQD	VARIANCE/FCN APPROVAL	DATE
X	QUALITY ASSURANCE	3/10/97	X	PROJECT MANAGER	3/7/97
	DATA QUALITY MANAGEMENT		X	FIELD MANAGER	3-10-97
	ANALYTICAL CUSTOMER SUPPORT			OTHER	
	OTHER			OTHER	

VARIANCE/FCN APPROVED [X]YES [ ]NO

REVISION REQUIRED: [ ]YES [x]NO

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QUALITY ASSURANCE:	OTHER:	OTHER:
FIELD MANAGER:	OTHER:	OTHER:

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TARGET ANALYTE LIST
AREA 1, PHASE I REMEDIAL ACTION WORK PLAN SAMPLING
Project Number 50.03.40.01

TAL A1PI - E

Metals		
1		Aluminum
2		Arsenic
3		Beryllium
4		Lead
5		Manganese
6		Molybdenum

Certification Sampling

UNCONTROLLED

Printed: 4-March-97

TARGET ANALYTE LIST
AREA 1, PHASE I REMEDIAL ACTION WORK PLAN SAMPLING
Project Number 50.03.40.01

TAL A1PI - J

Metals		
1		Arsenic

Printed: 4-March-97

TARGET ANALYTE LIST
AREA 1, PHASE I REMEDIAL ACTION WORK PLAN SAMPLING
Project Number 50.03.40.01

TAL A1PI - K

RADS		
1		Thorium-228
2		Thorium-230
3		Thorium-232

Printed: 4-March-97

TARGET ANALYTE LIST
AREA 1, PHASE I REMEDIAL ACTION WORK PLAN SAMPLING
Project Number 50.03.40.01

TAL A1PI - L

Metals		
1		Aluminum
2		Arsenic
3		Beryllium
4		Manganese
5		Molybdenum

Printed: 4-March-97

VARIANCE / FIELD CHANGE NOTICE	V/F No. 50.03.40.01-6
WBS NO.:50.03.40.01	Page 1 of 2
PROJECT TITLE: Area 1, Phase I Remedial Action Work Plan Certification Sampling PSP, Rev. 3 and OSDF Support Areas Certification PSP, Rev. 0	Date:3/19/97

682

VARIANCE / FIELD CHANGE NOTICE (Include justification):

Requirement

As stated in the above-referenced sampling plans, primary and duplicate samples are assigned the same sample identifier to keep the duplicate sample blind to the laboratory.

Variance

A variance is requested to add a "D" suffix to all duplicate samples collected. The primary sample number will remain the same.

This variance will also change the duplicate designator of "DUP" on the Sediment Basins OSDF Support Areas PSP to "D", to conform with all the other OSDF Support Areas duplicate designators.

This variance will remain in effect for both PSPs for the duration of their activities.

For example in the Area 1, Phase I PSP:
P20-20C-8-R is the primary sample.
P20-20C-8-R-D is the duplicate sample.

For example in the OSDF Support Areas PSP, North Access Road Sampling:
NAR 4-9C-R is the primary sample.
NAR 4-9C-R-D is the duplicate sample.

For example in the OSDF Support Areas PSP, Pump Station:
PUMP1-C-11-R is the primary sample.
PUMP1-C-11-R-D is the duplicate sample.

For example in the OSDF Support Areas PSP, Sediment Basin:
OSB-2C-8-R is the primary sample.
OSB-2C-8-R-D is the duplicate sample.

For example in the OSDF Support Areas PSP, Sediment Trap #1:
A1P1ST1-13C-R is the primary sample.
A1P1ST1-13C-R-D is the duplicate sample.

Justification

QA determined that the internal FDF problems caused by not having the suffix D on the sample outweighed the value of having the duplicate sample blind to the laboratory. The current process of assigning both the primary and duplicate samples the identical sample identification number, made distinguishing between them impossible in the database. With this variance, adding the suffix D will enable FDF users to distinguish between primary and duplicate samples in the database for data handling and reporting purposes.

There is no advantage to not having the suffix D on a sample going to an offsite laboratory. When an FDF sample is received by an external lab, it is assigned a lab internal tracking number. During analysis the sample is blind to the analyst. When the analysis is completed, the FDF sample number is reassigned to the sample for reporting purposes.

When the FDF sample is received by the onsite laboratory, the FACTS ID number as well as the sample number (including the suffix D) are tracked with the sample. The duplicate sample is not blind to the onsite lab. This is not a concern at this time since no certification samples are currently being analyzed at the on-site laboratory. If this changes, and the requirement to have the sample blind to the on-site laboratory is exercised, the sample number (with the suffix D) can be removed from the work card. The sample would then be tracked by the FACTS number only and would therefore be blind to the analyst.

REQUESTED BY: Joan White Date: 3/19/97

682

X IF REQD	VARIANCE/FCN APPROVAL	DATE	X IF REQD	VARIANCE/yFCN APPROVAL	DATE
	QUALITY ASSURANCE Kankanyi Thoko	3/24/97	x	PROJECT MANAGER Joan White	3/24/97
	DATA QUALITY MANAGEMENT		x	FIELD MANAGER Mike Zuck	3-21-97
	ANALYTICAL CUSTOMER SUPPORT			OTHER	
	OTHER			OTHER	

VARIANCE/FCN APPROVED [X]YES [ ]NO

REVISION REQUIRED: [ ]YES [x]NO

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PROJECT MANAGER:	DOCUMENT CONTROL: Esther Dittmer	OTHER:
QUALITY ASSURANCE:	OTHER:	OTHER:
FIELD MANAGER:	OTHER:	OTHER:

VARIANCE / FIELD CHANGE NOTICE

V/F50.03.40.01-9
682
Page 1 of 2

WBS NO.: 50.03.40.01

PROJECT TITLE: OSDF Support Areas Certification Sampling-PSP Rev. 0

Date: 3/19/97

VARIANCE / FIELD CHANGE NOTICE (Include justification):

Field Change Notice:

AT THE REQUEST OF THE V.P. OF SOILS & WATERS DIVISION:

This variance allows for 8 North Access Road (roadbed) samples collected as WAC samples and WAC archive samples in the On Site Disposal Facility (OSDF) Support Areas Project Specific Plan (NAR 4-8 through NAR 4-16), to be sent for certification analysis.

Justification:

A-Sample locations NAR 4-8 through NAR 4-16 exhibited more fill material (non-native clay) below the asphalt and macadem than the samples located along the roadbed to their south in CU3 and the southern half of CU4. Under these northernmost sample locations the roadbed is more built up with fill material. For these samples, a verbal variance was given to send the WAC interval (from the top of the fill to 6" below the top of the fill) for certification analysis. The possibility of certifying the fill material was being discussed by FDF Management with the Regulatory Agencies. The clay certification interval was sent for analysis in accordance with the PSP.

This action results in two certification intervals per location. The PSP identified clay certification interval number remained the same (NAR-4-14C-R). The added shallower certification interval from the fill material was identified by adding the number 2 behind the location number (NAR-4-14C2-R). Therefore, in the database the fill certification sample has a different number).

B-Subsequent to sending the top 6" of fill material for certification analysis, the request was made by FDF Management to send all the fill material in 6" increments for analysis in locations NAR 4-12 through NAR 4-16. This represents the stretch of roadbed built up to bring the Existing North Access Road up to the highway grade. The potential of allowing this section of roadbed (from the Proposed North Access Road tie-in up to the highway) was being discussed with the Regulatory Agencies. A verbal variance was given to prepare these samples for certification analysis.

This action results in more than two certification intervals per location. As stated in paragraph 2, the PSP identified clay certification interval number remained the same (NAR-4-14C-R). The shallowest fill certification interval has the number 2 added behind the location number (NAR-4-14C2-R). The next deepest fill certification interval will have the number 3 added behind the sample number (NAR-4-14C3-R), and so on for as many fill certification intervals there are in that location.

For example:

Fill interval 1 = NAR-4-14C2-R
Fill interval 2 = NAR-4-14C3-R
Fill interval 3 = NAR-4-14C4-R
Fill interval 4 = NAR-4-14C5-R
.....and so on.....
Clay interval = NAR-4-14C-R

UNCONTROLLED

000014

REQUESTED BY: Joan White Date: 3/19/97

X IF REQD	VARIANCE/FCN APPROVAL	DATE	X IF REQD	VARIANCE/FCN APPROVAL	DATE
X	QUALITY ASSURANCE		X	PROJECT MANAGER	3/24/97

	DATA QUALITY MANAGEMENT	3/24/97	X	FIELD MANAGER	3-20-97
	ANALYTICAL CUSTOMER SUPPORT			OTHER	682
	OTHER			OTHER	

RIANCE/FCN APPROVED [X]YES [ ]NO	REVISION REQUIRED: [ ]YES [x]NO

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PROJECT MANAGER:	DOCUMENT CONTROL: Michelle Tudor	OTHER:
QUALITY ASSURANCE:	OTHER:	OTHER:
FIELD MANAGER:	OTHER:	OTHER:

VARIANCE / FIELD CHANGE NOTICE	V/F No. 50.03.40.01-6
WBS NO.:50.03.40.01	Page 1 of 2
PROJECT TITLE: Area 1, Phase I Remedial Action Work Plan Certification Sampling PSP, Rev. 3 and OSDF Support Areas Certification PSP, Rev. 0	Date:3/19/97

682

VARIANCE / FIELD CHANGE NOTICE (Include justification):

Requirement

As stated in the above-referenced sampling plans, primary and duplicate samples are assigned the same sample identifier to keep the duplicate sample blind to the laboratory.

Variance

A variance is requested to add a "D" suffix to all duplicate samples collected. The primary sample number will remain the same.

This variance will also change the duplicate designator of "DUP" on the Sediment Basins OSDF Support Areas PSP to "D", to conform with all the other OSDF Support Areas duplicate designators.

This variance will remain in effect for both PSPs for the duration of their activities.

For example in the Area 1, Phase I PSP:
P20-20C-8-R is the primary sample.
P20-20C-8-R-D is the duplicate sample.

For example in the OSDF Support Areas PSP, North Access Road Sampling:
NAR 4-9C-R is the primary sample.
NAR 4-9C-R-D is the duplicate sample.

For example in the OSDF Support Areas PSP, Pump Station:
PUMP1-C-11-R is the primary sample.
PUMP1-C-11-R-D is the duplicate sample.

For example in the OSDF Support Areas PSP, Sediment Basin:
OSB-2C-8-R is the primary sample.
OSB-2C-8-R-D is the duplicate sample.

For example in the OSDF Support Areas PSP, Sediment Trap #1:
A1P1ST1-13C-R is the primary sample.
A1P1ST1-13C-R-D is the duplicate sample.

UNCONTROLLED

Justification

QA determined that the internal FDF problems caused by not having the suffix D on the sample outweighed the value of having the duplicate sample blind to the laboratory. The current process of assigning both the primary and duplicate samples the identical sample identification number, made distinguishing between them impossible in the database. With this variance, adding the suffix D will enable FDF users to distinguish between primary and duplicate samples in the database for data handling and reporting purposes.

There is no advantage to not having the suffix D on a sample going to an offsite laboratory. When an FDF sample is received by an external lab, it is assigned a lab internal tracking number. During analysis the sample is blind to the analyst. When the analysis is completed, the FDF sample number is reassigned to the sample for reporting purposes.

When the FDF sample is received by the onsite laboratory, the FACTS ID number as well as the sample number (including the suffix D) are tracked with the sample. The duplicate sample is not blind to the onsite lab. This is not a concern at this time since no certification samples are currently being analyzed at the on-site laboratory. If this changes, and the requirement to have the sample blind to the on-site laboratory is exercised, the sample number (with the suffix D) can be removed from the work card. The sample would then be tracked by the FACTS number only and would therefore be blind to the analyst.

000016

REQUESTED BY: Joan White Date: 3/19/97

X IF REQD	VARIANCE/FCN APPROVAL	DATE	X IF REQD	VARIANCE/FCN APPROVAL	DATE
X	QUALITY ASSURANCE Richard Hoxie	3/24/97	X	PROJECT MANAGER Joan White	3/24/97
	DATA QUALITY MANAGEMENT		X	FIELD MANAGER Mike Lewis	3-21-97
	ANALYTICAL CUSTOMER SUPPORT			OTHER	
	OTHER			OTHER	

VARIANCE / FIELD CHANGE NOTICE

V/F50.03.40.01-7

682

WBS NO.: 50.03.40.01

Page 1 of 1

PROJECT TITLE: OSDF Support Areas Certification Sampling-PSP Rev. 0

Date: 3/17/97

VARIANCE / FIELD CHANGE NOTICE (Include justification):

Field Change Notice:

This variance is to allow for Geoprobe WAC and Certification sample collection under the North Access Road Roadbed to be performed using one long core barrel, in addition to the multistep process identified in the On Site Disposal Facility (OSDF) Support Area Project Specific Plan (PSP).
The option to collect one long core barrel is already provided for in the PSP, Section 3.1.6, for sampling in the North Access Road East and West Ditches.

Justification:

Currently Section 3.1.2 of the PSP calls for the Geoprobe operator, when boring through the North Access Road (roadbed), to stop at the top of the compacted fill material, remove the core and put in a clean plastic core liner to collect the WAC sample(s). The operator is also to stop at the top of the clay, remove the core barrel and attach a clean cutting shoe (and liner) to collect the certification sample interval.

This multi-step operation was not possible at all sampling locations under the roadbed. Because of the large amount of precipitation experienced over the last several months, the fill material under the roadbed was saturated. Pulling out of the hole to change core barrels resulted in loosing the hole to cave-in. In these cases, the hole would have to be re-bored to access the certification layer. It was recognized after the first few locations that the option to perform the sampling using one long core barrel was needed.

UNCONTROLLED

REQUESTED BY: Joan White JFW Date: 3/17/97

X IF REQD	VARIANCE/FCN APPROVAL	DATE	X IF REQD	VARIANCE/FCN APPROVAL	DATE
X	QUALITY ASSURANCE	3/17/97	X	PROJECT MANAGER	3/18/97
	DATA QUALITY MANAGEMENT		X	FIELD MANAGER	3-18-97
	ANALYTICAL CUSTOMER SUPPORT			OTHER	
	OTHER			OTHER	

VARIANCE/FCN APPROVED [X]YES [ ]NO

REVISION REQUIRED: [ ]YES [x]NO

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PROJECT MANAGER:	DOCUMENT CONTROL: Michelle Tudor	OTHER:
QUALITY ASSURANCE:	OTHER:	OTHER:
FIELD MANAGER:	OTHER:	OTHER:

VARIANCE / FIELD CHANGE NOTICE

V/F50.03.40.01-8 68

WBS NO.: 50.03.40.01

Page 1 of 1

PROJECT TITLE: OSDF Support Areas Certification Sampling-PSP Rev. 0

Date: 3/17/97

VARIANCE / FIELD CHANGE NOTICE (Include justification):

Field Change Notice:

This variance changes the duplicate sample location in CU1 of the North Access Road. The duplicate location was moved from NAR 1-14 to NAR 1-16.

Justification:

The field technicians did not realize NAR 1-14 was the duplicate sample location until the sample was collected and the crew had moved on to sampling NAR 1-16. To go back to NAR 1-14 would require resampling that location and closing the North Access Road to traffic for a longer period of time that day. The road was being closed during only non-peak usage hours during the workday.

The sampling crew asked if NAR 16 could be the duplicate for CU1. A verbal variance was granted.

CONTROLLED

REQUESTED BY: Joan White Date: 3/17/97

X IF REQD	VARIANCE/FCN APPROVAL	DATE	X IF REQD	VARIANCE/FCN APPROVAL	DATE
X	QUALITY ASSURANCE	3/17/97	X	PROJECT MANAGER	3/18/97
	DATA QUALITY MANAGEMENT		X	FIELD MANAGER	3-18-97
	ANALYTICAL CUSTOMER SUPPORT			OTHER	
	OTHER			OTHER	

VARIANCE/FCN APPROVED [X]YES [ ]NO

REVISION REQUIRED: [ ]YES [x]NO

DISTRIBUTION

PROJECT MANAGER:	DOCUMENT CONTROL: Michelle Tudor	OTHER:
QUALITY ASSURANCE:	OTHER:	OTHER:
FIELD MANAGER:	OTHER:	OTHER:

VARIANCE / FIELD CHANGE NOTICE

V/F50.03.40.01-9

Page 1 of 2

WBS NO.: 50.03.40.01

PROJECT TITLE: OSDF Support Areas Certification Sampling-PSP Rev. 0

Date: 3/19/97

VARIANCE / FIELD CHANGE NOTICE (Include justification):

Field Change Notice:

AT THE REQUEST OF THE V.P. OF SOILS & WATERS DIVISION:

This variance allows for 8 North Access Road (roadbed) samples collected as WAC samples and WAC archive samples in the On Site Disposal Facility (OSDF) Support Areas Project Specific Plan (NAR 4-8 through NAR 4-16), to be sent for certification analysis.

Justification:

A-Sample locations NAR 4-8 through NAR 4-16 exhibited more fill material (non-native clay) below the asphalt and macadem than the samples located along the roadbed to their south in CU3 and the southern half of CU4. Under these northernmost sample locations the roadbed is more built up with fill material. For these samples, a verbal variance was given to send the WAC interval (from the top of the fill to 6" below the top of the fill) for certification analysis. The possibility of certifying the fill material was being discussed by FDF Management with the Regulatory Agencies. The clay certification interval was sent for analysis in accordance with the PSP.

This action results in two certification intervals per location. The PSP identified clay certification interval number remained the same (NAR-4-14C-R). The added shallower certification interval from the fill material was identified by adding the number 2 behind the location number (NAR-4-14C2-R). Therefore, in the database the fill certification sample has the different number).

B-Subsequent to sending the top 6" of fill material for certification analysis, the request was made by FDF Management to send all the fill material in 6" increments for analysis in locations NAR 4-12 through NAR 4-16. This represents the stretch of roadbed built up to bring the Existing North Access Road up to the highway grade. The potential of allowing this section of roadbed (from the Proposed North Access Road tie-in up to the highway) was being discussed with the Regulatory Agencies. A verbal variance was given to prepare these samples for certification analysis.

This action results in more than two certification intervals per location. As stated in paragraph 2, the PSP identified clay certification interval number remained the same (NAR-4-14C-R). The shallowest fill certification interval has the number 2 added behind the location number (NAR-4-14C2-R). The next deepest fill certification interval will have the number 3 added behind the sample number (NAR-4-14C3-R), and so on for as many fill certification intervals there are in that location.

For example:

Fill interval 1 = NAR-4-14C2-R
Fill interval 2 = NAR-4-14C3-R
Fill interval 3 = NAR-4-14C4-R
Fill interval 4 = NAR-4-14C5-R
.....and so on.....
Clay interval = NAR-4-14C-R

REQUESTED BY: Joan White Date: 3/19/97

X IF REQD	VARIANCE/FCN APPROVAL	DATE	X IF REQD	VARIANCE/FCN APPROVAL	DATE
X	QUALITY ASSURANCE		X	PROJECT MANAGER	3/24/97
	DATA QUALITY MANAGEMENT	3/24/97	X	FIELD MANAGER	3-20-97
	ANALYTICAL CUSTOMER SUPPORT			OTHER	
	OTHER			OTHER	

VARIANCE / FIELD CHANGE NOTICE

V/F No 50.03.40.01-10

PROJECT TITLE: OSDF Support Areas Certification Sampling, Rev. 0

Date: 4/7/96 82

VARIANCE / FIELD CHANGE NOTICE (Include justification):

Section 3.2 of the PSP (OSDF Sediment Basin Area) specifies approximate sample depth intervals which was based on a test hole excavation to determine the lithology. During recent additional core sampling and field observations, the lithology of the area was determined to be more variable across the five certification units than previously considered. This variance modifies the sample depths for WAC and certification sampling to be based on the soil descriptions at each core location performed by a project geologist rather than a standard, pre-determined depth interval.

The general lithology of the area consists of *in situ* soil and reworked material (clay) with small debris fragments located at the surface to approximately four feet deep. Where reworked clay soil does exist, the original grade level underlies the soil and can be identified by a relatively uniform color. The project geologist will select the intervals for WAC analysis, certification analysis and archival based on visual soil descriptions as follows:

1) One to two WAC samples will be collected from each location based on the lithology at each location. If the reworked clay and debris layer is <6 inches thick with native clay beneath, then only one WAC sample from the surface will be collected. If the reworked clay and debris layer is found to be >6 inches in thickness, then a second WAC sample will be collected beneath the upper WAC interval. The WAC sample immediately above the native clay will always be identified using a "B" in the sample ID (e.g., OSB-2W-4B-R). In locations where two WAC samples are necessary, the upper sample interval will be identified with a "A" in the sample ID (e.g., OSB-2W-4A-R).

2) The certification interval (four inches) will be collected from beneath the first or second WAC interval upon encountering the native clay soil. The certification interval will be selected based on the change to a uniform (color) and the characteristic soil properties of native clay as determined by the Project Geologist.

3) Archival samples will be collected in four-inch intervals for certification archival and in six-inch intervals for WAC archival. WAC archival samples will be collected from all depths above the certification interval not selected for laboratory analysis. The certification archival sample collected from beneath the certification interval. Archival samples will be stored at 4 °C (+/- 2 °C) for possible future analysis.

Justification:

The WAC and certification depth intervals currently specified in Section 3.2 of the PSP do not represent the variations in the clay fill depths and intervals encountered in additional test cores obtained from the planned Sediment Basin area.

The WAC sample IDs explanation is provided above for clarification purposes. Sample identification for the WAC samples were not fully described in the PSP.

UNCONTROLLED

REQUESTED BY: Mike Frank / Joan White MF 4/9/97 JWW 4/8/97 Date: 4-7-97

X IF REQD	VARIANCE/FCN APPROVAL	DATE	X IF REQD	VARIANCE/FCN APPROVAL	DATE
X	QUALITY ASSURANCE	R Kruske	x 4-9-97	PROJECT MANAGER	04/09/97
	DATA QUALITY MANAGEMENT		X	FIELD MANAGER	4-9-97
	ANALYTICAL CUSTOMER SUPPORT			OTHER	
	OTHER			OTHER	

VARIANCE/FCN APPROVED [X]YES [ ]NO REVISION REQUIRED: [ ]YES [x]NO

DISTRIBUTION

PROJECT MANAGER:	DOCUMENT CONTROL: Michelle Tudor	OTHER:
QUALITY ASSURANCE:	OTHER:	OTHER:
FIELD MANAGER:	OTHER:	OTHER:

0000520

PROJECT SPECIFIC PLAN FOR

OSDF SUPPORT AREAS

CERTIFICATION SAMPLING

Project Number: 50.03.40.01

Revision: 0

Date: March 4, 1997

Prepared by: Fluor Daniel Fernald

Prepared for: U.S. Department of Energy
Fernald Field Office

Under Contract DE-AC05-92OR21972

APPROVAL:

3/4/97
Chris Sutton, Project Lead — Date
Soil Characterization Excavation Project

3/4/97
Reinhard Friske, Quality Assurance — Date
Soil Characterization Excavation Project

3/4/97
Karen Voisard, Team Coach — Date
Environmental Monitoring Project

PROJECT SPECIFIC PLAN FOR

OSDF SUPPORT AREAS

CERTIFICATION SAMPLING

UNCONTROLLED

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1.0 INTRODUCTION

This Project Specific Plan describes the data collection activities to be performed to support the excavation of contaminated soil and certification of a number of support areas associated with the construction of the On-site Disposal Facility (OSDF). These support areas are within or next to Area 1, Phase I as defined in the Project Specific Plan (PSP) for Area 1, Phase I. Area 1, Phase I and the first cells of the planned OSDF are in the northeastern portion of the Fernald Environmental Management Project (FEMP).

In January 1996 the final Record of Decision for Operable Unit 5 was issued jointly by the United States Environmental Protection Agency (US EPA) and the Department of Energy (DOE). This decision document established the final remediation levels for environmental media, including soil, to be used uniformly across the FEMP. This Record of Decision formalized the commitment on the part of the DOE to implement remedial actions at the FEMP to excavate soil exhibiting concentrations exceeding these contaminant specific remediation levels and place the excavated materials in an on-site disposal facility. Excavated materials exceeding concentration-based acceptance criteria for the OSDF will be shipped from the site to an off-site commercial disposal facility. Following the excavation process, the Record of Decision further obligates the DOE to perform the necessary sampling and analysis to certify that the final remediation levels have been attained. This Project Specific Plan describes an approach to fulfill this obligation for the OSDF support areas outlined below.

This plan supports the excavation of contaminated soil and certification of the following OSDF support areas:

- A portion of the existing North Access Road
- The footprint of the planned OSDF Sediment Basin
- A sediment trap in Area 1, Phase I
- The footprint of the planned OSDF Pumping Station

Figure 1-1 presents a map of the study area identifying each of the OSDF support areas being addressed as part of this PSP.

During the process of implementing remedial actions in Area 1, Phase I and finalizing the detailed design of the OSDF, a number of areas requiring specialized excavation and certification approaches were identified. One of these areas is the North Access Road. As identified in the Project Specific Plan for Area 1 Phase I, the FEMP is planning the installation of a new North Access Road. This new access road is planned to divert from the existing North Access Road just south of State Route 126 and proceed east of the proposed OSDF and reconnect with the existing North Access Road south of the disposal facility. That portion of the existing North Access road that is to be effectively bypassed is proposed to be removed during the construction of the OSDF. To minimize disruption to the site, it is necessary to characterize the affected portion of the existing North Access Road in place before excavation for purposes of certifying the attainment of soil cleanup levels. Following certification sampling and analysis demonstrating Final Remediation Levels (FRLs) have been attained, the existing North Access Road will be removed to pre-established grades. The exhumed asphalt materials, base course materials and underlying clay will be placed in an impacted materials storage pile until the OSDF becomes available for the acceptance of wastes.

South of Area 1 Phase I, a sediment basin is planned to be constructed to receive runoff from the footprint of the OSDF. This basin will potentially receive contaminated sediment loading. The FEMP has a desire, however, to demonstrate through sampling and analysis that approximately 7,000 cubic yards of natural clay removed during the excavation of the basin does not contain site-introduced contaminants exceeding the FRLs.

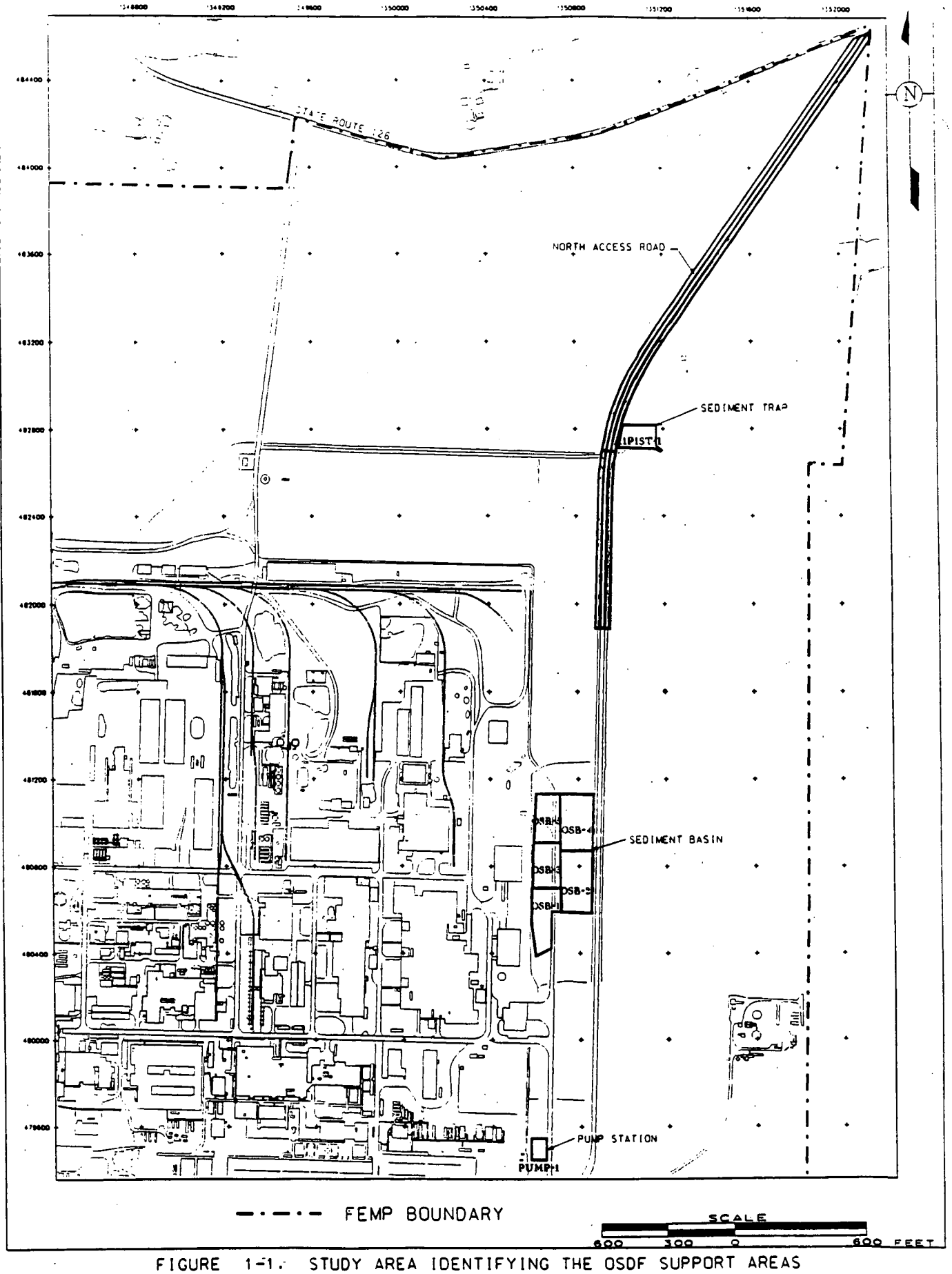


FIGURE 1-1. STUDY AREA IDENTIFYING THE OSDF SUPPORT AREAS

To facilitate the certification of this clay, the FEMP proposes to collect certification samples from the natural clay before excavation of the basin. The clay would be separately stockpiled for possible future construction use.

During the process of excavating Area 1 Phase I, a number of sediment traps were installed to minimize the potential for the migration of contaminated or clean sediment outside the excavation areas. One of these sediment traps is within the footprint of the proposed construction area for the OSDF and must be removed before OSDF construction. This trap is needed for sediment control and is proposed to remain in place until the excavation of the OSDF liner commences. Certification samples will be collected before removal of the unit by hand augering, coring, or by use of the Geoprobe® in accessible areas through the base and berms of the trap to the underlying materials. Pending receipt of analytical data, the berms, slopes, and bottom of the sediment trap will be removed to existing grades outside the sediment trap. Excavated materials will be placed in an impacted materials stockpile until the OSDF becomes available for waste placement. The remaining two sediment traps in Area 1, Phase I will be removed and certified at a later date when the designed need for these facilities no longer exists.

A pumping station is planned to be installed to support the transfer of leachate from the OSDF to existing FEMP storage and treatment facilities. Slightly contaminated soils within the footprint of the planned pumping station have been excavated down to six inches. The footprint of the pumping station will be certified at the current grade to demonstrate that the FRLs have been attained.

Sampling and analytical methods are consistent with the Project Specific Plan for Area 1 Phase I, the Sitewide CERCLA Quality Assurance Project Plan (SCQ), and project-specific Data Quality Objectives (DQOs) (Appendix A). An alternate sampling approach involving use of a truck-mounted Geoprobe® sampler is proposed for use in sampling the existing North Access Road. The Geoprobe® would also be employed in soil sampling in other areas if the weather or field conditions require its use. The on-site analytical laboratory will perform limited certification sample analysis on a contingency basis should commercial laboratory capacity not be available to meet FEMP schedules.

2.0 PROJECT ORGANIZATION

All project activities are being funded and overseen by the DOE Fernald Site Office (DOE-FEMP). DOE-FEMP also serves as liaison with USEPA and Ohio Environmental Protection Agency (OEPA) for all project activities. Fluor Daniel Fernald (FDF), operating under the terms of a prime contract with DOE, is responsible for the execution of the work activities associated with this project specific plan. Within FDF, the Soil Characterization and Excavation Project Team is directly accountable for the implementation of the project including excavation of contaminated material and certification of affected areas to demonstrate that final remediation levels were attained. Other FDF organizations are involved in the execution of this project by assigning technical resources to the Soil Characterization and Excavation Project team. Status of project activities will be provided to USEPA and OEPA on an as-needed basis and in the monthly Amended Consent Agreement Status Report. The members of the project team are listed in Table 1-1.

Table 1-1 Project Team Members

Title	Team Member
DOE Project Lead	Rob Janke
FDF Division Director	Dennis Carr
FDF Project Manager	Arlen Hunt
FDF Project Lead	Chris Sutton
FDF Field Coordinator	Joan White
FDF Field Sampling Lead	Mike Frank
FDF QA Lead	Reinhard Friske
FDF Health and Safety Lead	Kevin Tschaenn
FDF Data Management Contact	Jeff Maple

3.0 OSDF SUPPORT AREA SAMPLING

Each OSDF support area is divided into sections called Certification Units (CUs). The size distribution of each CU is based upon Area Specific Constituents Of Concern (ASCOC) dimensions of each area, and/or the topographic homogeneity of the area. The CUs applied to the planned sediment basin area, sediment trap, and the pumping station area are called Class I CUs. Class I CUs are areas representing pre-remediation of known or suspected ASCOC contamination and are not to exceed one acre. The CUs for the North Access Road and associated ditches were delineated based on topographic homogeneity (i.e., asphalt road areas versus ditches) and surface water runoff patterns of the ditches. Sampling for all OSDF support areas will be based on the boundaries of the CUs.

Precertification sampling, which consists of only WAC attainment sampling for the OSDF support areas, will take place before excavation of any soil. Soils identified as exceeding the OSDF WAC will be excavated and segregated for eventual off-site disposal. Soils identified as below the OSDF WAC, but above the FRL, will be excavated and separated for eventual disposal in the OSDF. Soils identified as below the FRL may stay in place or be excavated and stored for later use.

Additional precertification sampling may be conducted after WAC sampling to determine if areas are sufficiently prepared for certification sampling. Precertification sampling for WAC purposes will be conducted only for total uranium analysis.

When results of precertification sampling or historical data show that levels of contaminants are near or below the FRLs, certification sampling will be initiated. Certification samples will be collected from randomly selected locations within each CU. Appendix B maps illustrate the specific sampling locations for each area. CUs have been divided into 16 subunits of approximately equal surface area. Using a random number generator, one sample location has been selected out of each of the 16 subunits for primary

(radiological) and secondary (radiological, metals and/or polychlorinated biphenyls [PCBs]) COCs sample collection. Easting and northing coordinates within each subunit for each specific sample collection location is included in Appendix B. Sample analysis will be performed at an approved laboratory per the TALs (Target Analyte Lists) in Appendix C.

Quality control samples for certification sampling will consist of duplicate soil samples. Rinsate samples will be collected if sampling tools are reused as required by the SCQ. Quality assurance sample collection is discussed in Section 5.3. The Project Lead may initiate split samples (as described in Section 5.3) for quality assurance purposes and have the samples analyzed at both the on-site laboratory and an off-site laboratory (or two off-site laboratories) to compare results.

Each location from which a certification sample will be collected will be surveyed using Geodimeter and survey instrumentation or a Global Positioning System (GPS) unit, as conditions require. The approximate accuracy of the two survey instruments is 0.1 feet and 0.3 feet, respectively. The location will be staked with the sample location identifier marked clearly on the stake/flag before sample collection. The field sampling team will ensure that the staked location agrees with the field sampling map.

3.1 NORTH ACCESS ROAD

The portion of North Access Road that will be certified in-place is the existing road from coordinate N481,899 northward to State Route 126 and extending to the outer edges of the drainage ditches next to the road. For certification sampling, the area pertaining to the North Access Road and adjacent ditches will be subdivided into six CUs (see Figure 3-1). The road surface is divided into two CUs and both the western and eastern ditches are divided into two CUs.

The North Access Road CUs will be identified with the prefix "NAR". NAR1 is the southern part of the western ditch. NAR2 is the northern part of the western ditch. NAR3 is the road surface from the Fire Training Road (coordinate N482,686) South to coordinate N481,899 next to NAR1. NAR4 is the road surface from the Fire Training Facility Road North to State Route 126 next to NAR2. NAR5 is the southern part of the east ditch next to NAR3. NAR6 is the northern part of the eastern ditch next to NAR4.

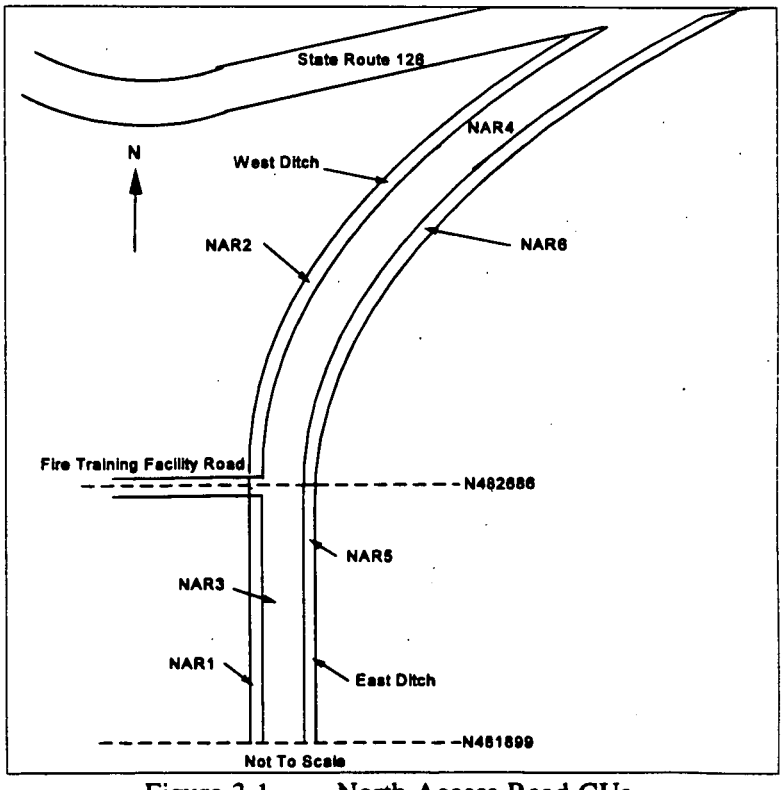


Figure 3-1 North Access Road CUs.

The North Access Road is being handled as a special case because the road surface and ditches are being certified in place for later construction activities. Three buried cables exist in the East Ditch that will result in a narrow band of surface area that will be excluded from sampling. The locations of the cables have been marked with flagging at the surface.

3.1.1 Precertification of North Access Road

Since the road surface is being certified in place and the interval being sampled for WAC is buried, WAC physical sampling will be conducted concurrently with certification sampling from the same locations. Sixteen (16) WAC samples will be collected and their locations are listed and illustrated in Appendix B. WAC samples will be analyzed for total uranium as listed in Table 3-1.

Table 3-1 Precertification WAC Attainment Sampling Analytical Requirements

Analyte	Sample Matrix	Sample Type	Preser-vative	Lab	ASL	Holding Time	Container
Total Uranium*	Solid	Grab	None	On-site	B	6 Months	Capped liner
* Bromopadap Method							

Since the road surface is being certified in-place and the interval being certified is buried, only WAC samples will be collected for precertification. The WAC sampling method and sampling intervals are described below as part of concurrent WAC and certification sample collection.

3.1.2 Certification of North Access Road

The North Access Road (excluding ditches) consists of two CUs that will be sampled for certification of the underlying native clay base at 16 randomly generated locations (i.e., 16 samples for primary COCs and 16 samples for secondary metal COCs) for each CU following the sample analytical requirements listed in Tables 3-2 and 3-4. Sample locations are illustrated and listed in Appendix B. WAC samples will be collected from each of the 16 certification sample locations in each CU.

The Geoprobe® will be used for core sampling and/or drilling through the North Access Road (road surface) for the collection of WAC and certification samples. The Geoprobe® will be operated according to the manufacturers recommendations. Test borings through the road surface (conducted previously) indicated a pavement thickness of approximately 2 inches with some geotextile fabric 1.5 inches below the surface. It overlays a 4-inch macadam base. Below the macadam base is approximately 11 inches of fill material. The top of the native clay soil is approximately 17 inches below the surface (see Figure 3-2).

Samples for WAC analysis will be collected from the top of the compacted fill material from the interval of approximately 6 to 12 inches below the surface. A WAC archive sample will be collected from the base of the first WAC sample to the top of the certification sample (approximately the 12 to 17-inch interval). WAC samples will be collected following the analytical requirements as listed in Tables 3-1. The operator will notice a change in probing rate as the core bit enters the top of the compacted fill material. The operator will stop at the top of the compacted fill material layer, remove the core, and put in a clean plastic core liner to collect the WAC sample

interval (6 to 12-inch interval) and the WAC archive interval (12 to 17-inch interval). The operator will stop at the top of the clay (approximately 17 inches below grade), remove the core barrel and attach a clean cutting shoe to collect the certification sample interval. The certification sample will be collected from the top of the clay layer at the interval from approximately 17 to 21 inches below the surface.

The Geoprobe® core sampler's design minimizes the decontamination requirements between sample intervals and locations. Since the soil passes directly through the sampler cutting shoe into the plastic liner, only the cutting shoe requires Level II decontamination following collection and removal of each discrete soil core. The core barrel will be wiped down using clean towels to remove all visible soil before collection of the next soil core interval. For coring through the asphalt and macadam base layers, a set of core samplers will be dedicated to this task for all NAR locations to minimize the decontamination effort required.

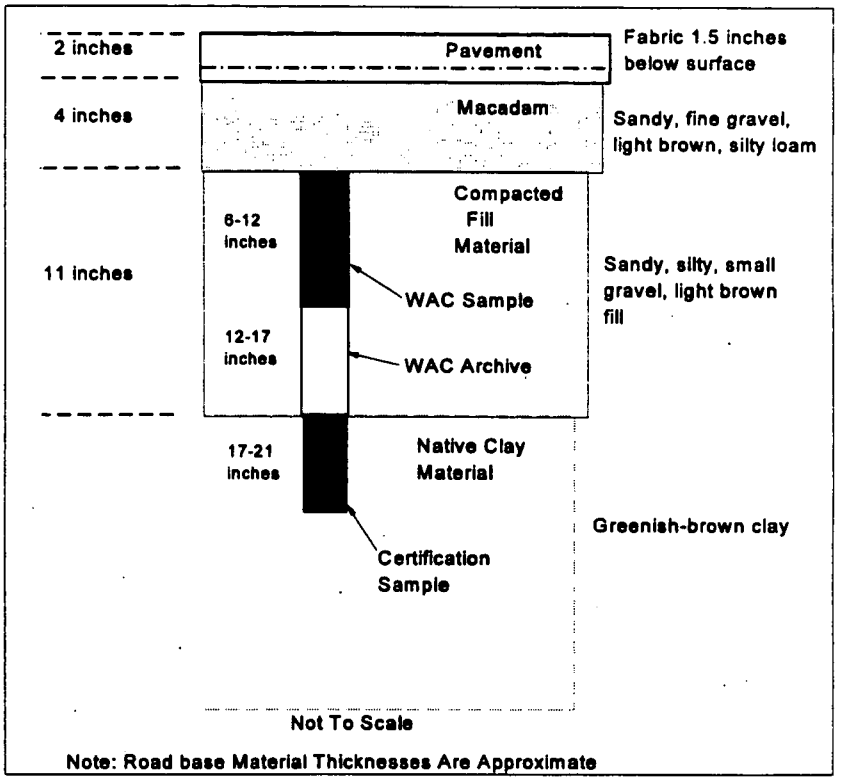


Figure 3-2 North Access Road Cross-Section

The actual core depth intervals for WAC and certification samples may require changes due to possible inconsistencies in the road base thickness. The Project Lead will provide direction on sample intervals if the base materials encountered vary for the depths described above.

The field team will record detailed information regarding the materials (strata) encountered at each boring location, the depth interval of each strata, and a detailed description of the material (asphalt, gravel, soil, tar, clay, etc.). This information will be used by the technician and Project Lead to properly determine where to collect the sample(s). Visual examination of the drill cuttings will be used to determine the type of material penetrated. All information will be recorded on the Field Activity Log. The field team will ensure that all loose asphalt/tar/gravel/ is removed from the hole before coring the sample intervals to prevent potential cross-contamination. This will be accomplished using a core sampler or hand auger. Each borehole will be backfilled with concrete.

Table 3-2 Certification Sampling, Primary Radiological COCs Analytical Requirements

Analyte	Sample Matrix	Sample Type	Preservative	Lab	ASL	Holding Time	Container
Uranium-235	Solid	Grab	None	Approved▲	D*	6 Months	Capped stainless steel or plastic liner or 500 mL glass or plastic container
Uranium-238							
Radium-226							
Radium-228							
Thorium-228							
Thorium-232							
Potassium-40■							

* See Section 8.0 for the definition of "D*".

▲ Approved laboratories, including the on-site laboratory, meet the FEMP SCQ specifications, audit requirements, and applicable contract specifications.

■ No FRLs have been established for potassium-40. Analytical data will be collected as part of the primary radiological analytical requirements for informational purposes only and will not be used as a factor in determining certification sampling success.

Table 3-3 Certification Sampling, Secondary COCs, Radiological Analytical Requirements

Analyte	Sample Matrix	Sample Type	Preservative	Lab	ASL	Holding Time	Container
Cesium-137	Solid	Grab	None	Approved▲	D*	6 Months	Capped stainless steel or plastic liner or 500 mL glass or plastic container
Thorium-230							

* See Section 8.0 for the definition of "D*".

▲ Approved laboratories, including the on-site laboratory, meet the FEMP SCQ specifications, audit requirements, and applicable and contract specifications.

Table 3-4 Certification Sampling, Secondary COCs, Metals and PCBs Analytical Requirements

Analyte	Sample Matrix	Sample Type	Preservative	Lab	ASL	Holding Time	Container
Aluminum*	Solid	Grab	Cool, 4°C	Approved▲	D	6 Months	Capped stainless steel or plastic liner or 500 mL glass or plastic container
Arsenic							
Beryllium							
Manganese							
Molybdenum							
Aroclor-1254	Solid	Grab	Cool, 4°C	Approved▲	D	14 Days	Capped stainless steel or plastic liner or 500 mL glass or plastic container
Aroclor-1260							

* Aluminum is not a COC but analytical data for aluminum will be collected as part of the certification process for informational purposes only (Benchmark Toxicity Values (BTVs) evaluation). This data will not be used as a factor in determining certification sampling success.

▲ Approved laboratories, including the on-site laboratory, meet the FEMP SCQ specifications, audit requirements, and applicable contract specifications.

3.1.5 Precertification of East and West Ditches

The east ditch contains three buried cable lines (one fiber optic and two conventional telephone cables) which have been marked with flagging at the surface. A five-foot wide area over the cables will be excluded from sampling due to the existence of these cables per the Ohio Revised Code.

Sixteen (16) WAC samples will be collected from each ditch CU. The WAC samples at the chosen locations will be collected from the 0 to 6-inch interval and submitted for total uranium analysis (Table 3-1). The interval from the base of WAC sample to the top of the clay will be cored and archived for potential WAC analysis at a later time. The WAC sampling method is described below since the certification sampling may be concurrent with the WAC sampling.

3.1.6 Certification of East and West Ditches

Each of the four ditch CUs will be sampled for certification at 16 randomly generated locations (i.e., 16 samples for primary COCs and 16 samples for secondary metal and/or PCB COCs) for each CU following the analytical requirements listed in Tables 3-2 and 3-4. Sample locations are illustrated and listed in Appendix B.

In preparation for certification sampling, one randomly located test hole in the west ditch has been hand augered which determined the approximate depth to the native clay layer as 12 inches, the

layer to be certified. The east ditch contains three buried cable lines (one fiber optic and two conventional telephone cables) which have been marked with flagging at the surface. If a penetration permit is not obtainable because of the presence of the buried cables, depth to the top of the clay will be assumed to be the same as determined by the test core in the western ditch. Due to the location of the buried cables, random sample locations that fall within 18 inches of the buried cable will be relocated by the Project Lead to the nearest possible safe location still within the ditch. The exclusion zone for these utilities is approximately five feet wide and spans the length of the NAR east ditch CU. Refer to Tables 3-2 and 3-4 for analytical requirements.

Certification samples will be collected from the top of the native clay (as determined by the test hole) to 4 inches below the top of the native clay, yielding a 4-inch sample of native clay. For example, if the top of the native clay is at 12 inches, then the certification interval will be from 12 to 16 inches. Using this example, if the certification location was also chosen as a WAC location, then the 0 to 6-inch interval will be collected for WAC, the 6 to 12-inch interval retained as a WAC archive, and the 12 to 16-inch interval sampled for certification. Once the liner is retrieved, it will be cut at the appropriate locations to separate the different samples. Penetrations should be a minimum of 18 inches to assure that the 4-inch native clay certification sample is collected.

Certification samples can be collected by using either hand auger methods, coring methods, or by using the Geoprobe®. If the Geoprobe® is used, the operation is to be conducted according to the operation and maintenance manual for the Geoprobe®. The grass/vegetation is to be removed from the sample location using a clean trowel or clean nitrile gloves and the Macro-Core sampler will be used to collect two to three adjacent core samples deep enough to retrieve 4 inches of native clay (12 to 16-inch interval), depending on the volume requirements for the location. The adjacent core locations will be within 4 inches of each other.

If Geoprobe® accessibility is not possible, the technician will remove the material above the sample interval using a hand-operated auger or core barrel sampler according to SMPL-01, *Solid Sampling*. Certification samples will be collected from the bottom of the hole using a 3-inch butyrate or stainless steel liner with a split or solid barrel sampler to collect a 4-inch long soil core. The liner will serve as a sample container and be capped at both ends immediately following sample collection. A 500 mL glass or plastic container may be used in place of the capped liner as field conditions require per the direction of the Field Sampling Lead. Each borehole on the shoulder or in the ditch line will be backfilled with bentonite pellets and properly hydrated.

3.2 OSDF SEDIMENT BASIN

The Sediment Basin area is located at the former gravel pad are north of the Receiving Incoming Materials, Inspection, and Accountability (RIMIA) building and west of the proposed OSDF. The location is designated to be a future Sediment Basin for the OSDF. In preparation for Sediment Basin construction, the 18 inches of gravel and six inches of fill material (e.g., soil and sparse debris) has been excavated from the area following WAC sampling and total uranium analysis of each lift excavated. The current soil strata conditions in this area consist of approximately 12 inches of soil fill above the former site grade level that existed before the gravel pad construction (Figure 3-3). The Sediment Basin construction plans include excavation of the existing soil fill and separately stockpiling the soil fill and clay soil. The clay soil will be stockpiled for possible future use in OSDF construction if analytical results demonstrate that the soil is below FRLs.

The area soils have been identified for potential use in cell construction because the soil concentrations below the fill soil are expected to be below the FRLs when certified, or below the OSDF WAC for total uranium and can therefore be used for fill material concurrent with construction material emplacement. This identification was based on historical and analytical results. Certifying the soil according to this PSP will ensure the soil meets the FRLs before use of clay soil from the sediment basin excavation.

The area planned for the Sediment Basin is divided into five CUs for certification sampling purposes. Sixteen certification samples and sixteen WAC samples will be collected from each CU. The certification sample interval is approximately 18 to 22 inches below the current grade, and will be certified in-place before excavation for the overlying soil fill. The specific details for the precertification (WAC) and certification sampling are described in Sections 3.2.1 and 3.2.2 below. Precertification and certification sampling will be performed concurrently in the field.

3.2.1 Precertification of OSDF Sediment Basin Sampling

Samples will be collected for the analysis of total uranium to determine if soil planned for excavation meets the WAC. Soil samples for WAC will be collected from each sixteen randomly located certification sample locations in each of the five Sediment Basin CUs. The Project Lead will determine if any additional physical soil samples will be collected. WAC samples will be collected from 0 to 6 inches and 12 to 18 inches below the current surface fill soil surface. WAC archive samples will be collected from 6 to 12 inches from the current fill soil surface (Figure 3-3).

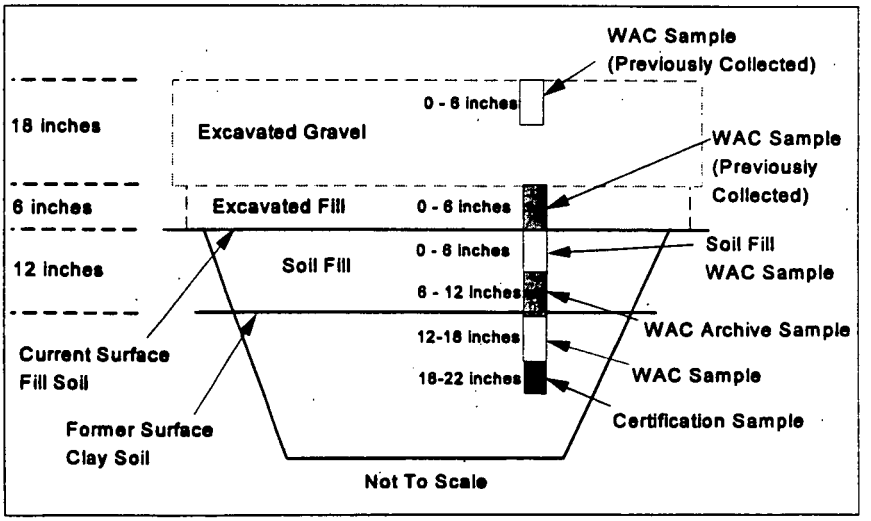


Figure 3-3 Sediment Basin Cross-Section

Samples will be collected using a 2 or 3-inch diameter butyrate or stainless steel liner with or without a split or solid barrel core sampler (as conditions require), or by using a hand auger, to collect a soil core to a depth of 6 inches. A 6-inch core sample will be collected to parallel the expected 6-inch soil excavation to be performed during remediation of Area 1, Phase I. Soil sampling will be completed according to SMPL-01, *Solid Sampling*. The liner will serve as the sample container and will be capped at both ends immediately following sample collection. The sample will be analyzed for total uranium at the on-site laboratory. Total uranium analytical requirements are listed in Table 3-1.

In the event the sample location is impenetrable to hand-operated samplers, the Geoprobe® may be used to collect the required sample. The Geoprobe® will be operated according to the manufacturer's recommendations. The sample location will be prepared as described above and

the sample will be collected using the Macro-Core sampler (1.5-inch diameter core) or a similar core sampler. The Geoprobe® will be used to collect a WAC sample and archive intervals at the locations selected for WAC. These sample intervals will be from 0 to 6 inches for the WAC analytical sample and 6 to 12 inches and 12 to 18 inches for the WAC archive samples (Figure 3-3). WAC samples will be analyzed for total uranium as specified in Table 3-1.

3.2.2 Certification of OSDF Sediment Basin Sampling

The sediment basin consists of five CUs and will be sampled for certification at 16 randomly generated locations (i.e., 16 samples for primary COCs and 16 samples for secondary metal and PCB COCs) for each CU following the analytical requirements listed in Tables 3-2 and 3-4. Sample locations are illustrated and listed in Appendix B.

Certification sampling will be conducted concurrently with the precertification WAC sampling at each of the 16 certification locations in each CU. The Geoprobe® Macro-Core sampler will be used to collect certification samples at the 18 to 22-inch interval below the existing grade. Two adjacent cores will be collected within four inches of each other to collect sufficient volume for analysis. Soil sampling will be completed according to SMPL-01, *Solid Sampling*. The liner will serve as the sample container and be capped at both ends immediately following sample collection or the soil may be placed in a sample container as listed on Tables 3-2 and 3-4.

3.3 SEDIMENT TRAP

Only one of the three sediment traps constructed in Area 1, Phase I to contain runoff from excavations in the East Field will be certified under this PSP. The first 1½ cells of the OSDF are planned to be built directly over this sediment trap that lies just to the east of the existing North Access Road in CU P18-40 (see map in Appendix B). The sediment trap, called Sediment Trap 1, will be certified as a single CU. Sediment Trap 1 is approximately 175 feet long by 110 feet wide with berms approximately 5 feet high.

The sediment traps were built or configured following excavation of potentially contaminated soil from the East Field, and were functional during the certification sampling that occurred in the East Field CUs in which the sediment basins reside. However, random certification locations that fell within the sediment traps were relocated, therefore, no certification samples were obtained from the sediment trap or berms themselves. Also, no WAC samples were obtained from the sediment traps or the material in the berms around them.

The sediment trap will be drained of standing water before sampling, exposing potentially three to six inches of sediment in the bottom of the trap. Since the berms and trap are still needed for drainage control from the East Field, they will be certified in-place and remain in-place and functional until OSDF cell construction begins.

Because the sediment traps and berms will be removed during OSDF cell construction, WAC sampling of the berm soil and sediment traps soils must occur. The soils below the sediment trap and berms are expected to remain for later use in OSDF construction. Therefore, certification sampling of the soils below the sediment trap must occur. Sampling of the trap and berms will be accomplished by hand augering methods or coring methods.

3.3.1 Precertification of Sediment Trap 1

Sixteen (16) WAC samples for total uranium analysis will be collected from the berm material and trap sediment material (see Figure 3-4). WAC sampling locations will coincide with the randomly generated 16 certification sampling locations in the berm and trap as described below. At each berm sample location, one WAC sample will be collected at the surface. All other material not collected for WAC samples between the berm top and the clay layer will be archived. No WAC interval needs to be collected from the top of the native clay since six inches of the native clay was excavated from the area before the sediment trap construction.

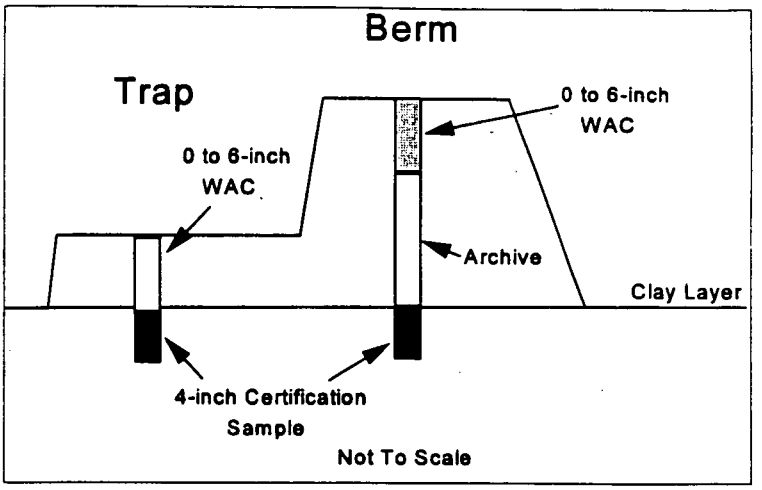


Figure 3-4 Typical Sediment Trap Cross-Section

3.3.2 Certification of Sediment Trap 1

Sediment Trap 1 consists of one CU which will be sampled for certification at 16 randomly generated locations (i.e., 16 samples for primary COCs and 16 samples for secondary metal COCs) for each CU following the analytical requirements listed in Tables 3-2 and 3-4. Sample locations are illustrated and listed in Appendix B.

Certification samples will be collected from native soils beneath the sediment trap and berms using a hand augering method or coring method. Certification samples in the trap will be collected concurrently with the WAC samples. The WAC sample will be collected from 0 to 6 inches and the certification sample from approximately 6 to 10 inches dependent on the depth to the native clay at each location. Certification samples beneath the berms will be collected from the top of the native clay to 4 inches below the top of the native clay. The native clay elevation (depth) will be estimated from the corresponding surface elevation at the outer base of the berm. The certification interval will be determined by the Field Sampling Lead (or a designee) based on the depth to native clay at each location.

3.4 OSDF PUMPING STATION

The Pumping Station Area is located south of the sediment basin and south of the RIMIA Building at the southwestern edge of the proposed OSDF. The planned area for the Pumping Station measures approximately 100 feet long by 70 feet wide. Six inches of the soil has been removed from this area in preparation for certification. The soil within this area will be certified to support the construction of the pumping station as a permanent facility supporting the OSDF.

3.4.1 Precertification of Pumping Station Area

Historical analytical results, history of land use, and total uranium results from previous WAC sampling for the Pumping Station area has placed it at very low risk for certification failure. No further precertification (WAC) sampling is necessary in this area.

3.4.2 Certification of Pumping Station Area

The Pumping Station Area consists of one CU which will be sampled for certification at 16 randomly generated locations (i.e., 16 samples for primary radiological COCs and 16 samples for secondary radiological, metal and PCB COCs) for each CU following the analytical requirements listed in Tables 3-2, 3-3 and 3-4. Secondary radiological COCs are identified because the historical data and knowledge available for this area are inadequate. Sample locations are illustrated and listed in Appendix B.

Samples will be collected using a 2 or 3-inch diameter butyrate or stainless steel liner with or without a split or solid barrel core sampler (as conditions require), or by using a hand auger, to collect a 0 to 4-inch soil core. Soil sampling will be completed according to SMPL-01, *Solid Sampling*. If field conditions require, the Geoprobe® Macro-Core sampler may be used to collect the sample according to the manufacturer's recommendations. The liner will serve as the sample container and will be capped at both ends immediately following sample collection.

3.5 DATA QUALITY OBJECTIVES

The following DQOs have been generated in support of OSDF Support Areas certification activities:

SL-023, Rev 5, *Area 1, Phase I and OSDF Support Area Certification Sampling*

SL-028, Rev 0, *Soils Waste Acceptance Criteria (WAC) Sampling for Total Uranium*

Uncontrolled copies of supporting DQOs are contained in Appendix A.

3.6 PROJECT-SPECIFIC PROCEDURES AND MANUALS

To assure consistency and data integrity, field activities in support of the PSP will follow the requirements and responsibilities outlined in controlled procedures and manufacturers' operational manuals. Applicable procedures and manuals include:

SMPL-01, *Solid Sampling*

SOP 766-S-1000, *Shipping Samples To Off-Site Laboratories*

Geoprobe® Model 5400 Operation and Maintenance Manual

Geodimeter® Total Station Survey Instrument Operation Manual

Trimble® Pathfinder Pro-XL GPS Operation Manual

3.7 SAMPLE IDENTIFICATION

All physical soil samples collected for laboratory analysis will be assigned a unique sample identifier (Appendix B). Primary and duplicate samples will be given the same sample identifier but will be assigned sequential FACTS sample identification numbers before acceptance by the on-site laboratory. The numbering format will be divided into four parts separated by hyphens and will appear as:

@##-##X-**-@*

The first part of the number is the column and row of the CU where:

@ = alpha character (column letter I through Q from A1,PI site grid)
# = numeric character (row number 13 through 21 from A1,PI site grid)

For OSDF Support Areas, the first part of the sample number will be replaced with a unique prefix. Examples include:

NAR= North Access Road CU
OSB = OSDF Sediment Basin CU
PUMP= Pumping Station CU
ST1 = Sediment Trap 1

The second part is the CU block and sample type where:

X = sample type ("W" for WAC or "C" for certification)

The third part is the sub-CU designator (1 through 16) with an optional alpha character (*) to identify additional samples taken from the same sub-CU (A through E).

The fourth part is the sample type designator (* = additional sample type designator). Different designators include:

R = Radiological, Primary (for certification sample)
R = Total Uranium (for WAC sample)
S = Radiological, Secondary
M = Metals
P = PCBs
V = Archive Sample (certification samples only)

For example:

Sample number P20-10W-A-R is a sample collected from the CU within Column P, Row 20, Block 10 for WAC ("W") attainment. This is the first sample (designator "A") collected for total uranium analysis ("R").

Sample number P20-10C-5-RS is a sample collected from the CU within Column P, Row 20, Block 10, for certification ("C") sampling. The sample has been collected from sub-CU 5 and will be analyzed for Primary ("R") and Secondary ("S") Radiological parameters.

Sample number PUMP-C-2-MPV is a sample collected from the Pumping Station OSDF Support Area for certification ("C") sampling. The sample is collected from sub-CU 2 for metals ("M") and PCB ("P") analysis. This sample is to be archived ("V").

The dimensions (vertices) of all CUs are established on control maps that permanently establish the locations and certification status. Subsequent certification work plans will interface with these established CUs.

3.8 EQUIPMENT DECONTAMINATION

Sampling equipment will be decontaminated before transport to the sample field site and after all sampling is completed to limit the introduction of contaminants from equipment to sampled media and to protect worker safety and health. The decontamination of equipment that comes into contact with the sample (i.e., the core cutting shoe, if used) will be a Level II decontamination as referenced in Section K.11 of the SCQ. For concurrent WAC and certification sampling in the same borehole, decontamination of the core tip or cutting shoe will be required between the WAC interval and certification interval to prevent cross-contamination. The use of clean disposable wipes to replace air drying can be used. The core barrel portion of the sampler will be wiped down between sample intervals and locations to remove visible soil or material. Decontamination of the core barrel will not be necessary because the core barrel will not come into contact with the sample when using a liner insert.

Stainless steel liners returned from the off-site laboratory after sample analysis may be reused after the completion of a Level II decontamination. Excess custody tape adhering to the exterior of the stainless steel liners may be allowed to remain before reuse due to the difficulty in removing the tape.

3.9 SAMPLE HANDLING, SHIPPING, ARCHIVAL

3.9.1 Sample Handling

All samples will be collected in either a plastic (butyrate) or stainless steel liner or standard sample container. For samples collected in a liner, the technician will ensure that plastic caps are placed on both ends and properly seated. Each liner will be encircled with custody tape and the sampling technician will initial and date both taped caps. For samples collected in a container, the technician will ensure that the external surfaces, including the threads, are free of visible debris (a disposable towel will be used for exterior container cleaning). After careful placement of the sample into the container, the technician will place the lid securely on and encircle it with custody tape. The technician will initial and date the taped lid. If samples require preservation through cooling, then place the samples inside an insulated transportable container and cool to 4°C using artificial ice (or other means). After collection, the technician will affix a Fernald Analytical Customer Tracking System (FACTS)-generated label to each sample liner/container.

All field measurements, observations, and sample collection information will be recorded as applicable on the Sample Collection Log, the Field Activity Log, and the Chain of Custody/Request for Analysis Form as required. The method of sample collection will be specified

in the Field Activity Log. Samples will be assigned a unique sample identifier as listed in Appendix B. Refer to Section 3.7 for a description of the sample identifiers to be used. This unique sample identifier will appear on the Chain of Custody/Request for Analysis and will be used to identify the sample during analysis, data entry, and data management. The appropriate TAL identifier from Appendix C will be listed on each Chain of Custody/Request for Analysis.

3.9.2 Sample Shipping

All samples will be transported from the field to room 158 in the on-site laboratory (clean side) in an adequately constructed container for handling. Samples to be analyzed at the on-site laboratory will require no special sample shipping instructions. For samples requiring off-site laboratory analysis, on-site laboratory personnel will follow the requirements of Standard Operating Procedure (SOP) 766-S-1000, *Shipping Samples To Off-Site Laboratories*. Gross alpha/beta analysis is not required for transportation of the certification samples to an off-site laboratory (reference Appendix D).

3.9.3 Sample Archival

Archive samples will be collected for WAC analysis as specified in Section 3.3 or as directed by the Project Lead. Archive samples will be collected and handled in the same manner as the certification samples but will be archived under proper chain-of-custody protocol for possible future analysis. Archive samples will be stored in a secure location as specified by the Field Sampling Lead. Archive samples may be collected for PCB analysis and stored for up to two-times the standard holding time (maximum 28 days). If analysis is performed between the standard holding time (14 days) and the 28 day holding time, the analytical data will be qualified but useful for certification decisions.

4.0 LABORATORY SAMPLE PREPARATION

Physical samples collected for laboratory analysis will be prepared in a consistent manner by the selected laboratory (on-site and off-site).

4.1 CHEMICAL ANALYSIS

To ensure consistency in sample preparation for chemical analysis, both onsite and offsite laboratories will, at a minimum, ensure that the entire sample liner contents are thoroughly homogenized before removal of the sample aliquot for chemical analysis.

4.2 RADIOLOGICAL ANALYSIS

Both on-site and offsite laboratories will, at a minimum, meet the following guidelines for radiological analysis sample preparation:

1) All sample material (including any organic matter) will be removed from the liner (or sample container), weighed, and recorded. The analyst performing this step will describe the appearance of the sample.

2) All sample material will be dried at 105° to 112° C for a minimum of 8 hours to constant weight.

3) The percent moisture content of the sample will be calculated and recorded.

4) The entire sample will then be ground until all the material passes through a 1 millimeter sieve.

5) The sample will then be mixed by hand or machine.

6) The necessary aliquot will be removed for analysis and the remaining sampled material archived.

5.0 QUALITY ASSURANCE - QUALITY CONTROL REQUIREMENTS

Sampling events will follow Quality Assurance/Quality Control (QA/QC) protocol as established in Section 4 of the SCQ.

5.1 PROJECT REQUIREMENTS FOR INDEPENDENT ASSESSMENTS

Project management has ultimate responsibility for the quality of the work processes and the results of the sampling activities covered by this PSP. The FEMP QA organization will conduct independent assessments of the work process and operations to assure the quality of performance. Assessment will encompass technical and procedural requirements of this PSP and the SCQ. Independent assessment will be performed by conducting surveillances. As a minimum, one surveillance will be conducted during implementation of this PSP, consisting of monitoring/observing on-going project activity and work areas to verify conformance to specified requirements. Surveillances will be planned and documented according to Section 12.3 of the SCQ.

5.2 IMPLEMENTATION OF FIELD CHANGES

If field conditions require changes or variances, the Field Sampling Lead must obtain written approval (electronic mail is acceptable) from the Project Lead and QA before the changes may be implemented. Changes to the PSP will be noted in the applicable field activity logs and on a Variance Request/Field Change Notice Form (VR/FCN). QA must receive the completed VR/FCN, which includes the signatures of the Project Sampling Lead, Project Lead, and the QA Representative, within 7 working days of the granting of the verbal approval.

Land surveying was performed for each OSDF support area to facilitate the selection of CU boundaries and to minimize random sample locations falling in inaccessible locations or outside the support areas. If field conditions require the moving of a randomly selected physical sample location, the Field Sampling Lead can move the location up to three feet without obtaining authorization from the Project Lead or completing a variance provided the location remains in the same CU and the distance, direction, and reason for the change is noted on the Field Activity Log. The technician will use survey instrumentation and the field maps contained in the area-specific sampling packets to assure that the relocated sample location remains within the same CU. Examples of reasons why the location can be moved up to three feet are to avoid buried obstructions (i.e., boulders) or to avoid adverse surface conditions such as standing water.

A VR/FCN will be necessary for sample locations moved more than three feet. These locations must also remain in the same CU.

5.3 QUALITY ASSURANCE

Quality control samples for certification sampling will consist of duplicate soil samples and rinsate samples from the final rinse water of decontaminated sampling equipment (Appendix E). Duplicate soil samples will be collected for analysis at a rate of 1 per CU per analytical group (i.e., primary radiological parameters, secondary radiological parameters, metals, and PCBs). Duplicate samples will be collected in the same manner as split samples described below except the samples will be sent to the same laboratory for analysis. Duplicate samples will not be collected for required archive samples. Rinsate samples will be collected for every 20 pieces of sampling equipment or for every CU, whichever is more frequent. Rinsates will be analyzed for total uranium and arsenic parameters as listed in TAL AIPI - A through G (Appendix C).

A split sample may be initiated by the Project Lead if considered necessary for quality assurance purposes to verify the comparability between on-site and off-site laboratories or between off-site laboratories. A split sample will be collected by initially collecting twice as much material as normally collected for a sample. After mixing (following the homogenization process in SMPL-01, *Solid Sampling*), the material will be apportioned into two sets of containers. Both sets of containers will be submitted for analyses with one set designated as an "original sample", and the other designated as a "split sample". The split sample will be prepared in the field by the technicians at the sampling location. Using a stainless steel trowel and mixing pan, the technician will carefully homogenize the soil by mixing it together, dividing it into four quarters, mixing the opposite quarters together and containerize the two samples per SMPL-01, *Solid Sampling*.

6.0 DISPOSITION OF WASTES

During completion of sampling activities, technicians will generate contact and decontamination waste. Following completion of sampling, the technicians will place contact wastes into properly labeled bags and dispose of it according to appropriate FEMP waste management policies. Waste materials determined to be free of contamination will be disposed of in an on-site uncontrolled access dumpster.

Excess soil generated during the sampling process will be returned to the surface point of origin. Debris such as asphalt and road base materials will be placed on the East Impacted Soil Stockpile according to the FEMP soil remediation project procedures.

7.0 HEALTH AND SAFETY

Technicians will conform to precautionary surveys performed by personnel representing the Utility Engineer, Industrial Hygiene, and Radiological Control. Concurrence with applicable safety permits (indicated by the signature of each sampling technician assigned to this project) is expected by sampling technicians in the performance of their assigned duties.

The Field Sampling Lead will ensure that each technician performing sampling related to this project has read the Project-Specific Health Safety Matrix (PSHSM) identified as CON-MTX-1039, dated May 1996, or the applicable project specific health and safety matrix for the A1PI specific work area. Technicians who do not sign these documents will not participate in the execution of sampling activities related to the

completion of assigned project responsibilities. A copy of applicable safety permits/surveys issued for worker safety and health will be posted at each sample location area.

8.0 DATA MANAGEMENT

A data management process will be implemented so information collected during the investigation will be properly managed following completion of the field activities. As specified in Section 5.1 of the SCQ, sampling teams will describe daily activities on the Field Activity Log sufficient for the sampling team to reconstruct a particular situation without reliance on memory. Sample Collection Logs will be completed according to instructions specified in Appendix B of the SCQ.

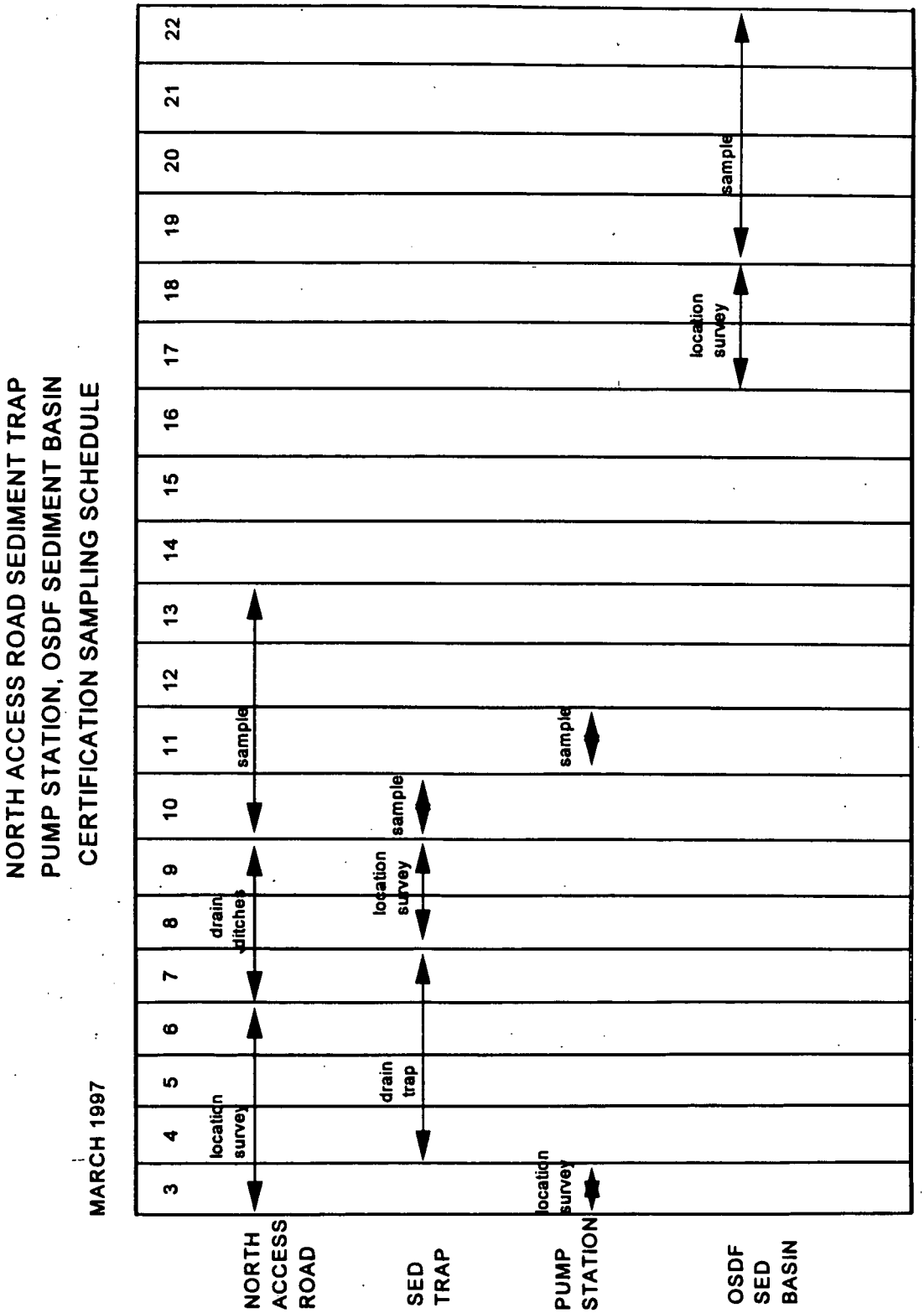
Electronically recorded data from the Geodimeter and GPS unit will be downloaded to disks on a weekly basis or as the project requires. Technicians will review the data for completeness and accuracy and then download it onto the Local Area Network (LAN). Once on the LAN, the Data Management Contact within the Soils Certification and Excavation Project will perform an evaluation of the data. Once complete, the data will be sent to the loader where it will be loaded onto the Oracle system and an error log will be generated. The data will then be made available to users through both the Graphical Information System (GIS) and Microsoft (MS) Access Software.

Field documentation, such as the Field Activity Log, Gamma Spectrometry Field Worksheet, Geodimeter Survey Files, Nuclear Field Density/Moisture Worksheet, and the Sample Collection Log will undergo an internal QA/QC review by the technicians. Copies will then be generated and will be delivered to the Data Management Contact who will perform an evaluation of the data and create the appropriate links between the electronically-recorded data and the paper-generated data. From this point, the paper-generated data will be sent to data entry personnel for input into the Oracle System. Field logs may be completed in the field and maintained in loose-leaf form.

Analytical data from on-site and offsite laboratories will be reported in preliminary form to the Project Lead by the lab contact when the data is available in the FACTS database. Following validation of the data for each sample release, the data for that release will be reported to the Project Lead in the final data report format. For chemical analyses required soils certification data deliverables will be ASL D (full data deliverables) as specified in the FEMP SCQ. Modifications will be made to add analytes, tighten the QC criteria and lower detection limits from those specified in the CLP SOW to target the needed data and data quality to the Project objectives. These modifications are specified in the DQOs, and will be reflected in the laboratory task orders. Task orders will undergo review and approval by the FEMP validation and Data Quality Objective organizations before being issued. One hundred percent of the data will be reviewed by either the FEMP data validation organization, a subcontracting validation organization, or the project team with a minimum of ten percent of this data validated to ASL D with full data packages and the remainder of the chemical data will be validated.

For radiological analyses required soils certification data deliverables will be ASL D* (Appendix F). This data deliverable will be identical to the specification for ASL D (full data deliverables) in the FEMP SCQ, with the exception that some Highest Allowable Minimum Detectable Concentrations (HAMDC) will be elevated. These HAMDC elevations are appropriate based on the requirements of some FRLs being less stringent than the equivalent requirements for the RI/FS which was the basis for the SCQ ASL D criteria. These modifications are specified in the DQOs, and will be reflected in the laboratory task orders. Because the HAMDCs are not equivalent to the SCQ, these Task Orders, though equivalent in data quality to ASL D, will be issued as ASL D* (see Appendix D). One hundred percent of the data will be reviewed and qualified by either the FEMP data validation organization, a subcontracting validation organization, or the project team with a minimum of ten percent of this data validated to ASL D* (Appendix F). The remainder of the radiological data will be validated to the minimum requirements.

9.0 SCHEDULE


NORTH ACCESS ROAD SEDIMENT TRAP
PUMP STATION, OSDF SEDIMENT BASIN
CERTIFICATION SAMPLING SCHEDULE
MARCH 1997
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location survey
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location survey
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SED TRAP
PUMP STATION
OSDF SED BASIN

SRCIG DGN MAP HOR DPTH RAM-NR16.DGN 3-4-97 STATE PLANAR COORDINATE SYSTEM 1927

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N

NAR-4

P20

Q20

NAR-2

NAR-6

Q19

P19

P19

P18

Q18

P-18-31

P-18-32

P18

P-18-

NAR-5

P-18-13

NAR-1

P-18-11

P-18

P-17-33

P-17-40

NAR-3

P-17-31

LEGEND:

FEMP BOUNDARY

PLANNED CERTIFICATION SAMPLE LOCATIONS

SCALE

200 100 0 200 FEET

NORTH ACCESS ROAD

000046

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APPENDIX A

DATA QUALITY OBJECTIVES
SL-023 AND SL-028

**Note: The attached DQOs are for informational purposed only.
Refer to controlled copies for most current revision.**

Control Number _____

Fernald Environmental Management Project

Data Quality Objectives

Title: Soils Waste Acceptance Criteria (WAC) Sampling for Total Uranium

Number: SL-028

Revision: 0

Effective Date: 3/4/97

Contact Name: Keith A. Nelson

Approval: _____ **Date:** March 4, 1997

DQO Coordinator
William D. Kelley

Approval: _____ **Date:** 3/4/97

Project Lead
Chris Sutton

Rev. #	0				
Date:	3/4/97				

Data Quality Objectives

Soils Waste Acceptance Criteria (WAC) Sampling for Total Uranium

Members of Data Quality Objectives (DQO) Scoping Team

The members of the scoping team included individuals with expertise in Quality Assurance (QA), analytical methods, field sampling, statistics and risk assessment.

Conceptual Model of the Site

Soil is considered contaminated if the average soil concentration of an area-specific constituent(s) of concern (ASCOCs) in a certification unit (CU) exceeds the final remediation levels (FRLs)(See the Area 1 Phase 1 (A1P1) Remedial Action Work Plan, Draft, Rev. date 11/96). Additionally, soil can be identified as exceeding the waste acceptance criteria (WAC) for the On Site Disposal Facility(OSDF).

FEMP remediation includes the construction of an OSDF to be used for the disposal and permanent safekeeping of materials above the site FRLs, but below the WAC. The WAC for total uranium must be met in locations where soils are to be identified for potential use in OSDF cell construction, or for placement in the cell as fill material, concurrent with construction material emplacement. For construction purposes, the soils must have contaminant levels below the FRL (for cell construction) or below the OSDF WAC (for material dispositioned into the OSDF).

The primary source of contamination in peripheral or boundary areas is airborne deposition from the former production area of the FEMP. The extent of soil contamination was estimated and published in the Operable Unit 5 Feasibility Study (FS). These estimates were based on kriging analysis of available uranium data for soil collected during the Remedial Investigation (RI) effort and from other FEMP environmental studies. Maps outlining contaminated soil boundaries were generated for the Operable Unit 5 FS by overlaying the results of the kriging analysis of uranium data with isoconcentration maps of the other constituents of concern (COCs), as presented in the Operable Unit 5 RI report, and further modified by spatial analysis of maps reflecting the most current soil characterization data. For WAC, historical data have demonstrated that only total uranium has a probability of being present in certain areas. In these areas where only total uranium is demonstrated, or suspected of being the only WAC concern, this DQO approach will be used. Total uranium has extensive distribution over the site and is the major concern for soils dispositioned in the OSDF.

1.0 Statement of Problem

Physical sampling needs to be performed on site soils to demonstrate whether the soils are acceptable or unacceptable for disposal in the OSDF based on their compliance with WAC for total uranium.

Exposure to Soils

The WAC concentration for total uranium was developed using fate and transport modeling, and was designed to prevent a breakthrough to the environment no greater than a specified Maximum Contaminant Level (MCL) over a 1,000 year period (see Table 1).

Available Resources

Time: WAC sampling and analysis must be completed before excavation and disposition of excavated soils.

Project Constraints: WAC sampling and analysis must be performed with existing manpower and materials to support the remediation and certification schedule. Remediation, construction activities and regrading of the site to meet final land use commitments is dependent on successful completion of this work.

Summary of Contamination Problem

Site remediation, commencing with Area 1, Phase I, began in the summer of 1996. Soil will be classified as either:

1. Contaminated above WAC level for total uranium and unacceptable for disposal in the OSDF.

2. Contaminated and acceptable for disposal in the OSDF (below WAC).

2.0 Identify the Decision

Decision

The decision process that will be reached as a result of WAC physical sampling and analytical testing is the identification of soils for compliance with WAC. For soils below the WAC, the total uranium level is not to exceed (NTE) 1,030 ppm.

Possible Results

1. Soil is contaminated above the WAC for total uranium. This material will be excavated and segregated for eventual off-site disposition.

2. Soil is contaminated at or below the WAC for total uranium. The total uranium WAC level of 1,030 ppm has not been exceeded for soils to be dispositioned in the OSDF.

3.0 Identify Inputs That Affect the Decision

Required Information

WAC are determined by physical sampling analyses. In-situ readings for total uranium can be used to bias locations for WAC physical sampling.

Source of Informational Input

Information will be required from various sources:

1. Historical data from the Sitewide Environmental Database (SED).

2. In-situ readings using the mobile NaI system and the stationary HPGe system.

3. Physical samples for laboratory analysis.

Contaminant-Specific Action Levels

The WAC for total uranium was published in the Operable Unit 5 Record of Decision [ROD] (see Table 1). The WAC were developed using fate and transport modeling, and were designed to prevent a breakthrough to the environment no greater than a specified Maximum Contaminant Level (MCL) over a 1,000 year period.

Methods of Sampling and Analysis

Physical samples will be collected at a depth of six inches for total uranium analysis. WAC decisions will be based only on the analysis results of the physical samples.

Physical samples can be randomly located or biased. Randomly located WAC samples can be collected concurrently with the randomly located certification samples. Physical samples will be analyzed at ASL B.

When accessible, field instrumentation and analytical methods will be employed to bias WAC physical sample locations towards hot spots. A mobile NaI system may be utilized for complete coverage of the areas of concern, and information may be obtained from strategic stationary readings from HPGe systems. Analysis and data management for the NaI and HPGe systems will be conducted at ASL E and performed according to applicable site procedures. The NaI system may be utilized to establish general screening radiological concentrations and detect hot spots. Daily source checks will be conducted as directed in the systems' operational procedures. Screening readings data will be reviewed at least daily by the Field Lead.

ASL E protocols have not been developed for NaI and HPGe systems. These protocols are in the process of development. This demonstration technology will only be utilized to provide screening information to support WAC attainment activities.

4.0 The Boundaries of the Situation

Spatial Boundaries

Domain of the Decision: The boundaries of WAC sampling are limited to soils in the designated CUs. The depth boundary is 6 inches, which determines each 6 inch excavation lift.

Population of Soils: The affected soils include all surface and subsurface soils.

Scale of Decision Making

Based on considerations of the final certification units and output from the COC evaluation process, the areas undergoing excavation will be evaluated as to whether the soils meet or exceed WAC. WAC sampling will be conducted within the established CU boundaries as referenced in the applicable Project Specific Plans (PSPs) (see Table 2). Additional information on CUs is provided in Sections 7.4 and 7.5 of the Draft A1P1 RAWP, Rev. E, dated 11/96.

Temporal Boundaries

Time frame: WAC sampling efforts will be conducted both before and during excavation. Analytical results and screening information must be processed in time for the information to be useful within the current remediation schedule.

Time Constraints on Sampling: The scheduling of WAC sampling is closely associated with the excavation and certification schedule. WAC sampling will be performed before and during excavation and prior to certification sampling.

Practical Considerations: In cases where an area is being certified in place for later excavation (the WAC interval is below-grade level), WAC sampling can occur concurrently with certification sampling.

In-situ gamma spectrometry readings cannot be made during snow coverage or standing water conditions or during precipitation. Field analytical methods should also be limited to unsaturated soils. Most areas of concern are flat open terrain and are readily accessible. Some areas may require preparation, such as cutting of grass or removal of undergrowth, fencing and other obstacles. In-situ measurements will require coordination with appropriate maintenance personnel for site preparation. Physical and environmental parameters will be recorded and considered during data collection. When certification is being conducted below grade level (such as with the North Access Road), WAC sampling will be performed concurrent with certification.

Weather, moisture and ambient conditions affect sampling and schedule.

5.0 Develop a Logic Statement

Parameters of Interest

The only identified COC for WAC is total uranium.

Decision Rules

In areas inaccessible to the NaI and HPGe systems, such as a buried WAC interval, or in areas exhibiting topographic or environmental restrictions, WAC locations will be randomly generated. Randomly generated WAC points can be taken concurrently with certification samples. Biased sample locations may be identified by using in-situ systems. WAC sampling locations will be randomly generated when not using biased sampling.

Where in-situ screenings are utilized, relative radiological readings will be used to identify biased areas in the CU above the total uranium WAC in any 12 square meter (m^2) area as identified by the NaI system. The HPGe system will be used at a high-biased area in the CU to further delineate the physical sample location. Where multiple high biased readings occur, multiple HPGe readings will be obtained. At least one physical sample will be taken at the highest HPGe reading location per CU. All HPGe biased locations with readings above WAC will receive physical samples.

When only random generated points are used for physical sampling points, each CU will be subdivided into 16 equal subunits. One physical sample will be taken randomly within each subunit. When biased sampling is not used, homogeneity of total uranium distribution is assumed for each subunit.

If the physical sample results for surface soil in any given subunit within a CU is greater than the WAC, the Project Lead will initiate one of the following:

- Perform physical sampling to further delineate the area of WAC exceedence and define additional removal efforts to be performed prior to resampling the area under WAC.

- The soils in each individual subunit that exceed WAC will be excavated, segregated for eventual off-site disposition and resampled.

6.0 Limits on Decision Errors

Range of Parameter Limits

The range of soil concentrations anticipated after excavation of the top 6 inches of soil in peripheral areas for total uranium will be from background to greater than the maximum subsurface value indicated in the RI database.

Types of Decision Errors and Consequences

Definition

Decision Error 1: This decision error occurs when the decision maker decides a CU is below WAC when the average soil concentration in a CU is still above WAC. This would allow soil above the WAC to be allowed into the OSDF.

Decision Error 2: This decision error occurs when the decision maker continues excavation or directs soils to off-site disposition when soils are actually below the WAC. This would result in added costs due to the excavation of soils below WAC, increased volume in off-site facilities and increased cost of off-site disposition. This is not as severe as Decision Error 1.

True State of Nature for the Decision Errors

The true state of nature for Decision Error 1 is that the actual concentration of total uranium is greater than the WAC. The true state of nature for Decision Error 2 is that the true concentration of total uranium is below the WAC.

Null Hypothesis

H_o: Surface soil concentration for total uranium in the CU is greater than the WAC

H_1: Surface soil concentration or total uranium in the CU is less than or equal to WAC.

False Positive and False Negative Errors

A false positive is Decision Error 1: Since the WAC for total uranium is a NTE level, this is unacceptable.

A false negative is Decision Error 2: less than or equal to 20 percent confidence level is considered the acceptable decision error.

7.0 Design for Obtaining Quality Data

The areas that are to be excavated will be sampled in accordance with the appropriate PSP.

Radiological Soil Sampling

A minimum of one physical sample will be collected and analyzed for WAC attainment of total uranium, at locations potentially biased based on the reported in-situ system readings. Factors such as topography and historical data may also be considered. All physical sampling activities will meet requirements as outlined in the FEMP SCQ for ASL B. Physical samples will be analyzed at the on-site FEMP lab using the Bromo PDAP method for total uranium. Rinsates will be collected of field sampling equipment if field equipment is to be reused.

When necessary, the Project Lead will have the flexibility to collect additional biased samples. Sample collection and QA/QC will follow the FEMP SCQ protocols and the PSP.

Gamma Discernible COC

Based on topography, soil saturation and other factors, radiological information may be generated by two complementary gamma detection methods employed to determine relative radiological activity in areas in preparation for WAC attainment. When used, the two methods will consist of the mobile sodium iodide (NaI) detection system currently mounted on the NaI system, which will provide screening for uranium, and the high purity germanium (HPGe) systems that will provide stationary screening of all total uranium. When field gamma readings are required, a field moisture analysis or sample for lab moisture analysis will be obtained.

Sodium Iodide (NaI) System

Prior to excavation or certification the mobile NaI system may be used to cover up to 100 percent of an area to determine relative uranium levels above WAC. The NaI detector(s) is coupled to a multichannel analyzer (MCA) and calibrated to detect uranium. The system will be used in a roving mode at a nominal speed of 2 miles per hour (mph) and minimum count times of 2 seconds. At this speed and count time, a gamma reading will be made and recorded every 12 m^2. The mobile system incorporates a global positioning system (GPS) rover and base unit to record the location of every reading. Counting and positioning information will be recorded continuously on a field personal computer (PC) and stored on disk or hard drive for future downloading on the site soil database and Geographical Information System (GIS) system.

If areas are identified with readings exceeding the WAC, they will be further evaluated using the HPGe detector.

HPGe Detectors

The HPGe system(s) will be used to further bias sampling areas that potentially exceed WAC. Based on the appearance of the mapped NaI system radiological contours, additional HPGe readings will be obtained for locations exceeding WAC. HPGe readings will be downloaded nightly to the FEMP local area network for review and evaluation by the project management team. HPGE field duplicates will be collected at a minimum frequency of one per CU (a more stringent criterion for this project than the SCQ specification of one per twenty).

Interpretation of WAC Results

WAC decisions will be made based on physical sample data only. At the discretion of the Project Lead, this decision may be supported with additional physical sample data or in-situ readings.

8.0 Data Management

Physical sample field logs will be reviewed by the Field Lead. Physical sample data packages will be independently reviewed to SCQ ASL B requirements. Qualified data packages will be forwarded to the Project Data Management Team for review and will be stored in the SED. NaI system and HPGe screening data will be forwarded to the Project Data Management Team for review, and will be stored in the Soils Remediation Data Integrated GIS (SRDIG).

Data Quality Objectives

Area 1 Phase 1
Waste Acceptance Criteria Sampling

1A Task/Description: Waste Acceptance Criteria Sampling and Analysis

1.B. Project Phase: (Put an X in the appropriate selection.)

RI ☐ FS ☐ RD ☐ RA ☒ R_vA ☐ OTHER

1.C. DQO No.: SL-028 DQO Reference No.: N/A

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2. Media Characterization: (Put an X in the appropriate selection.)

Air ☐ Biological ☐ Groundwater ☐ Sediment ☒ Soil ☒

Waste ☐ Wastewater ☐ Surface water ☐ Other (specify) _____

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3. Data Use with Analytical Support Level (A-E): (Put an X in the appropriate Analytical Support Level selection(s) beside each applicable Data Use.)

Site Characterization
A ☐ B ☐ C ☐ D ☐ E ☐

Risk Assessment
A ☐ B ☐ C ☐ D ☐ E ☐

Evaluation of Alternatives
A ☐ B ☐ C ☐ D ☐ E ☐

Engineering Design
A ☐ B ☐ C ☐ D ☐ E ☐

Monitoring during remediation activities
A ☐ B ☐ C ☐ D ☐ E ☐

Other Waste Acceptance Criteria
A ☐ B ☒ C ☐ D ☐ E ☒

4.A. Drivers: Area 1 Phase 1 Remedial Action Work Plan (RAWP), Applicable or Relevant and Appropriate Requirements (ARARs) and Operable Unit 5 Record of Decision (ROD)

4.B. Objective: To provide data for identification of soils for compliance with Waste Acceptance Criteria.

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5. Site Information (Description):

The OU2 and OU5 RODs have identified areas at the FEMP requiring soil remediation. The RODs specify that FEMP soils will be below the WAC for disposal in the OSDF. Waste Acceptance Criteria analyses will be necessary for areas of the site with soils that are scheduled for certification.

6.A. Data Types with appropriate Analytical Support Level Equipment Selection and SCQ Reference: (Place an "X" to the right of the appropriate box or boxes selecting the type of analysis or analyses required. Then select the type of equipment to perform the analysis if appropriate. Please include a reference to the SCQ Section.)

1. pH	☐	2. Uranium	☒*	3. BTX	☐
Temperature	☐	Full Radiologic	☐	TPH	☐
Specific Conductance	☐	Metals	☐	Oil/Grease	☐
Dissolved Oxygen	☐	Cyanide	☐		
Technetium-99	☐	Silica	☐		
4. Cations	☐	5. VOA	☐	6. Other(specify)	☒**
Anions	☐	BNA	☐		
TOC	☐	Pesticides	☐		
TCLP	☐	PCB	☐		
CEC	☐				
COD	☐				

* Total uranium

** Moisture

6.B. Equipment Selection and SCQ Reference:

Equipment Selection		Refer to SCQ Section	
ASL A	Moisture	SCQ Section:	Appendix G
ASL B	Bromo PDAP	SCQ Section:	Appendix G
ASL C		SCQ Section:	
ASL D		SCQ Section:	
ASL E	NaI Detector, HPGe Detector	SCQ Section:	

7.A. Sampling Methods: (Put an X in the appropriate selection.)

Biased	X	Composite	☐	Environmental	☐	Grab	X	Grid	X
Intrusive	X	Non-Intrusive	X	Phased	☐	Source	☐		

DQO Number: SL-028

7.B. Sample Work Plan Reference: The DQO is being established prior to completion of the work plan.

Background samples: OU5 RI

7.C. Sample Collection Reference:

Sample Collection Reference: PSP # 50.03.40.01, SMPL-01

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8. Quality Control Samples: (Place an "X" in the appropriate selection box.)

8.A. Field Quality Control Samples:

Trip Blanks	☐	Container Blanks	☐
Field Blanks	☐ *	Duplicate Samples	X
Equipment Rinsate Samples	X **	Split Samples	☐
Preservative Blanks	☐	Performance Evaluation samples	☐

Other (specify) _____

* Traditional field blanks will not be collected.

** Traditional rinsates applicable to this type of sampling will not be collected, unless sampling equipment or shipping containers are reused.

8.B. Laboratory Quality Control Samples:

Method Blank	X	Matrix Duplicate/Replicate	☐
Matrix Spike	X	Surrogate Spikes	☐

Other (specify) Per method

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9. Other: Please provide any other germane information that may impact the data quality or gathering of this particular objective, task or data use.

TABLE 1
WAC CONSTITUENT OF CONCERN*

Analytical Suites	WAC Constituent of Concern	WAC*
Gamma discernable radiological or Bromo PDAP	Total uranium	1030 mg/kg

* total uranium for physical samples will be determined based on the sum of individual isotopes.

TABLE 2
SUMMARY OF CERTIFICATION UNITS

Classification*	Justification for Designation	Scale
Class I	Areas representing pre-remediation known or suspected ASCOC contamination	Not to exceed 1 acre
Class II	Areas representing inconsistent radiological contamination	Not to exceed 4 acres
Class III	Areas with no analytical data indicating site-introduced contamination and no production history of potential contamination	Not to exceed 16 acres

NOTE: Modification to dimensions of CUs will be necessary in some instances to "fit" irregularities of areas undergoing certification.

Control Number _____

Fernald Environmental Management Project

Data Quality Objectives

Title: Area 1 Phase 1 and On Site Disposal Cell (OSDF) Support Areas Certification

Number: SL-023

Revision: 6

Effective Date: 3/04/97

Contact Name: Keith A. Nelson

Approval: William D. Kelley **Date:** 3-4-97

William D. Kelley
DQO Coordinator

Approval: Chris Sutton **Date:** 3/4/97

Chris Sutton
Project Lead

Rev. #	0	1	2	3	4	5	6
Effective Date:	10/17/96	11/5/96	11/7/96	12/18/96	2/10/97	2/28/97	3/04/97

DATA QUALITY OBJECTIVES
Area 1 Phase 1 and OSDF Support Areas Certification Sampling and Analysis

Members of Data Quality Objectives (DQO) Scoping Team
The members of the scoping team included individuals with expertise in QA, analytical methods, field sampling, statistics and risk assessment.

Conceptual Model of the Site
Soil is considered contaminated if the concentration of an area-specific constituent(s) of concern (ASCOCs) in a Certification unit (CU) exceeds the final remediation levels (FRLs) (See the Area 1 Phase 1 (A1P1) Remedial Action Work Plan, Draft, Rev. date 11/96). The primary source of contamination in peripheral or boundary areas is airborne deposition from the former production area of the FEMP. The extent of soil contamination was estimated and published in the Operable Unit 5 Feasibility Study (FS). These estimates were based on kriging analysis of available uranium data for soil collected during the Remedial Investigation (RI) effort and other FEMP environmental studies. Maps outlining contaminated soil boundaries were generated for the Operable Unit 5 FS by overlaying the results of the kriging analysis of uranium data with isoconcentration maps of the other constituents of concern (COCs), as presented in the Operable Unit 5 RI report, and further modified by spatial analysis of maps reflecting the most current soil characterization data. A sequential remediation plan has been presented which subdivides the FEMP into seven construction areas. Extensive historical sampling has demonstrated that, in each of the seven areas, a subset of the ASCOCs is present. These ASCOCs need to be evaluated in the certification process for the individual construction areas. The certification sampling and analysis program supports a sequential process for site remediation by documenting that each of these seven construction areas, or phase areas, within the construction areas have met their area specific FRLs established in the Operable Unit 5 Record Of Decision (OU5 ROD).

1.0 Statement of Problem

Site soils need to be certified for compliance with the FRLs. The appropriate sampling, analytical and data management criteria must be developed to provide the required qualified data necessary for certification compliance. A sampling plan must be in place that will allow representative samples to be collected. The appropriate analytical methodologies need to be selected that will provide the required data.

Exposure to Soils
The cleanup standards, or FRLs, were developed for a final site land use as an undeveloped park. Under this exposure scenario, receptors could be exposed to contaminated soils through dermal contact (nonradiological COCs), external radiation (radionuclides), incidental ingestion, and/or inhalation of fugitive dust while visiting the park. Exposure to contaminated soil is expected to occur at random locations within the boundaries of the FEMP and would not be limited to any single area.

Benchmark Toxicity Values (BTVs) are also being considered in the cleanup process by assessing habitat impact for individual BTVs under post-remedial conditions (see Table 1 for identified BTVs).

Available Resources

Time: Certification sampling will be accomplished by the field team of samplers prior to final regrading or release of soils for construction activities. The certification sampling schedule must allow sufficient time, in the event additional remediation is required, to demonstrate certification of FRLs prior to permanent construction or regrading. Certification sampling will have to be completed and analytical results validated prior to submission of a certification report to the regulatory agencies.

Project Constraints: Certification sampling and analytical testing must be performed with existing manpower and materials to support the certification effort. Construction areas are prioritized for certification sampling and analysis according to the date required for initiation of sequential construction activities in those areas. Remediation began with the excavation of Area 1 Phase 1 in the fall of 1996. Fluor Daniel Fernald (FDF) and DOE must demonstrate post-remedial compliance with the FRLs in designated construction areas to release the areas for planned construction activities and regrading.

Summary of Contamination Problem

Site remediation, commencing with Area 1, Phase I, began in the fall of 1996 to support construction of the On-Site Disposal Facility (OSDF). FDF and DOE require an accurate assessment of contamination so they can accurately characterize the material as either acceptable or unacceptable for disposal in the OSDF, and proceed with remediation and construction activities. The soil will be classified as acceptable for disposal in the OSDF(below WAC) or unacceptable for disposal in the OSDF without additional treatment(exceeding WAC). Identification, delineation and release of soils acceptable for disposal in the OSDF are priorities for certification.

2.0 Identify the Decision

Decision

Demonstrate in areas to be certified, whether the average concentration of each ASCOC is below the FRL, on a CU by CU basis, and within the agreed upon confidence limits (primary ASCOCs, 95%; secondary ASCOCs, 90%).

Possible Results

1. The average concentration of each ASCOC within the CU can be demonstrated to be below the FRLs within the confidence level. The CU can then be certified as having achieved cleanup standards.

2. The average concentration of at least one ASCOC for a CU is demonstrated to be above the FRL at the given confidence level. The CU will fail certification require additional FDF management decisions.

3. If the average concentration of any one ASCOC for the CU is demonstrated to be three times the FRL, the CU will fail certification. The CU will require additional FDF management assessment.

3.0 Inputs That Affect the Decision

Required Information
Based on analytical results of certification sampling, the average concentrations of ASCOCs in individual CUs, using agreed-upon confidence levels, will be calculated.

Source of Information
Analysis of certification samples for ASCOCs will be conducted at analytical support level (ASL) D(chemical) and D*(radiological) in accordance with methods and QA/QC standards in the FEMP Sitewide CERCLA Quality Assurance Project Plan [SCQ (DOE 1993)] with modifications made for radiological analyses to tailor the detection limits requirements to the project. The QA/QC standards include field duplicate samples with minimum frequency of one per CU. Field record logs will be reviewed to verify that field activities provide the required samples for CU certification.

Contaminant-Specific Action Levels
The cleanup levels are the FRLs published in the Operable Unit 5 ROD. BTVs that are being considered are published in the Operable Unit 5 Ecological Risk Assessment and are being reviewed for site consideration in the Natural Resources Restoration Plan (NRRP). (see Table 1). The compounds listed are those identified as ASCOCs in A1P1 and OSDF Support Areas.

Methods of Sampling and Analysis
Samples will be collected in accordance with the PSPs and applicable site sampling procedures. Laboratory analysis for ASCOCs will be conducted at ASL D(chemical) and D*(radiological) using QC/QA protocols specified in the SCQ. For radiological analyses the Highest Allowable Minimum Detection Capability (HAMDC) may be modified to target the data quality to the FRLs, instead of the RI/FS detection limits which were the basis for the SCQ. Full raw data deliverables will be required from the laboratory to allow for complete data validation. For FEMP-approved on- and off-site laboratories, methodologies will be evaluated prior to use to verify that they have the required precision and detection capabilities necessary to achieve FRL analyte ranges.

4.0 The Boundaries of the Situation

Spatial Boundaries
Domain of the Decision: The boundaries of this certification DQO are limited to soil in areas that are undergoing certification in A1P1 and OSDF Support Areas.

Population of Soils: Surface soil includes excavated surfaces as well as undisturbed, native soils in areas undergoing certification sampling and analysis.

Scale of Decision Making
Based on considerations of the final certification units and the COC evaluation process, the COCs for specific areas were determined. The areas undergoing excavation will be evaluated as to whether the CU has passed or failed the certification criteria.

Temporal Boundaries
Time frame: Certification sampling must be performed in time to sequentially release certified areas for scheduled construction regrading and other final land use activities. Certification sampling data must be received from the laboratory, evaluated and compiled, and final certification reports written, issued, and submitted to the regulatory agencies for their concurrence, prior to release of the areas for construction, regrading or other final land use.

Time Constraints on Sampling: The scheduling of certification must allow time for the collection of samples, analysis, data verification and validation, and development of the certification reports. The certification report must be submitted to the regulators for their concurrence prior to the beginning of construction and/or regrading in the applicable work area.

Practical Considerations: Some areas undergoing remediation are open grassland or will be cleared during excavation and made readily accessible. Areas may require preparation, such as cutting of grass or removal of undergrowth prior to certification sampling, thus requiring coordination with FEMP Maintenance personnel.

5.0 Decision Rule

Parameters of Interest
The parameters of interest are the average surface soil concentrations and confidence limits for each ASCOC within a CU (See Table 1 for the compounds currently identified as ASCOCs in the areas undergoing certification sampling and analysis).

Action Levels
The action levels are the soil FRLs published in the OU5 ROD (See Table 1).

Decision Rules
If the average radiological and chemical contamination in each CU is demonstrated to be below the FRLs within the agreed upon confidence level (95% for primary COCs; 90% for secondary COCs), then the CU can be certified as complying with the cleanup criteria. If a CU does not meet the FRL within the agreed upon confidence level for at least one ASCOC.

6.0 Use of Data to test Null Hypothesis

Based on the certification analytical data, the following formula will be used to test the null hypothesis within each CU:

$$t = \frac{FRL - \bar{x}_i}{\sqrt{S_i^2/(n)}}$$

where:
- t = critical value
- FRL = final remediation goal
- $\bar{x}_i$ = mean of the i^{th} CU
- S^2_i = sample variance of the ith CU
- n = number of samples from the i^{th} CU.

If the computed value (t) exceeds the critical value of a t-distribution for alpha = 0.05 for primary ASCOCs and 0.10 for secondary ASCOCs, at n-1 degrees of freedom, then the null hypothesis is rejected and the CU is certified as having average ASCOC concentrations below the applicable FRL.

7.0 Limits on Decision Errors

Range of Parameter Limits
The expected and reasonable range of ASCOC concentrations in soils undergoing certification sampling is from natural background (for COCs with background levels) to the expected post-remedial action level; however, the upper limit could be the maximum values identified in the soils database.

Types of Decision Errors and Consequences

Definition

Decision Error 1: This decision error occurs when the decision maker decides a CU is in compliance with FRLs (average below the FRL) when in reality the actual average is still above one or more FRLs. This situation could result in an increased risk to human health and the environment. In addition, this type of error could result in regulatory fees and penalties. This decision error would be unfavorable.

Decision Error 2: This decision error occurs when the decision maker decides a CU is contaminated (average at or above the FRL) when the CU average is actually below the action level(s). An error in this direction would be unfavorable from a cost and schedule perspective, but not as serious as Decision Error 1. This would result in added costs due to the excavation of allowable residual soils and increased volume of soils assigned to the OSDF.

True State of Nature for the Decision Errors

The true state of nature for Decision Error 1 is that the actual average concentration of an ASCOC in soil is greater than the action level. The true state of nature for Decision Error 2 is that the actual average concentration of an ASCOC is below the action level for FRLs.

Null Hypothesis

H_0: The average concentration of at least one ASCOC in the CU is equal to or greater than the action levels.

H_1: The average concentration of all ASCOCs in the CU is less than the action levels.

False Positive and False Negative Errors

A false positive is Decision Error 1: less than or equal to five percent is considered the acceptable decision error in determination of compliance with FRLs; ten percent is used for secondary ASCOCs.

A false negative is Decision Error 2: less than or equal to 20 percent is considered the acceptable decision error. This was controlled through the determination of sample sizes (See Section 7.0, Resource Effective Design subsection.)

8.0 Design for Obtaining Quality Data

General Sampling and Analysis Design

A sampling design will be developed which would collect discrete samples from each CU (see below). Discrete samples will be collected using a systematic random sampling grid by dividing each CU into 16 equal sampling subunits. Each sample will be collected using approved methodology as described in the Project Specific Plans (PSPs) to obtain the specified quantity of soil to be obtained from each sample point.

Each sample will be submitted to FEMP-approved laboratories for the appropriate ASL D (chemical) or D*(radiological) analysis (acceptable analytical methods and/or performance criteria are defined in the FEMP SCQ). For radiological analyses, the Highest Allowable Minimum Detection Capability (HAMDC) may be modified to target the data quality to the FRLs, instead of the RI/FS detection limits which were the basis for the SCQ. FDF will specify to the laboratory the appropriate number and type of method QA/QC samples based on the type of analysis and number of samples as defined in the SCQ. Laboratory data deliverables will include summary forms and raw data. Selected methodologies will be reviewed prior to use to insure that they provide sufficient sensitivity and precision.

Field QC will include field duplicates at a minimum frequency of one per CU. Rinsates will be performed of sampling material where equipment is reused. Traditional field blanks will not be collected. The probability of deposition contamination with this methodology is minimal. The elimination of allowances for contamination provides for a worst-case approach. A limited number of rinsates of the sleeves used as sample containers will be used as container blanks, to provide a level of confidence that these containers are not a source of contamination.

A 100% review of the data per the requirements of the PSP, including a minimum of 10% full data validation of data packages to ASL D, will be performed by either the FDF validation team or subcontract validation team.

Resource Effective Design

The number of samples required to demonstrate statistical confidence is determined based on variability of existing historical sample data in areas not contaminated above the FRLs. For example, in Area 1, Phase 1 and the OSDF support areas, the minimum of twelve primary and minimum of nine secondary ASCOC samples determined per CU (see Table 3) represent the number of samples required to minimize decision errors in the estimate of the mean under a discrete sampling program. This sampling program is based on the assumptions of variability, maximum expected mean soil concentrations, and acceptable probabilities of error. The maximum expected mean soil concentration is based on engineering design estimates after excavation and target average concentration goal, and are assumed

to be 75% of the FRL, which is consistent with previous information collected from Area 1, Phase 1. For simplicity, and to assure that the ASCOCs will be adequately sampled to achieve acceptable confidence levels, the maximum number of samples required to meet the confidence level for the group of primary COCs and the group of secondary COCs have been selected to achieve the desired confidence for all COCs within primary and secondary groups. For example, in Area 1, Phase 1, this minimum number of samples for secondary ASCOCs is nine per CU based on the secondary parameter with the greatest sample requirement, arsenic. The minimum number of samples for primary ASCOCs in Area 1, Phase 1 is 12 per CU based on Radium-226 per the described assumptions. Any additional samples taken beyond the minimum samples per CU will be included in the average (n) ASCOC concentrations.

The number of samples required to achieve statistical confidence was determined from the following equation:

Details and Assumptions of the Design

$$n = \frac{(Z_{1-\alpha} + Z_{1-\beta})^2}{\left(\frac{FRL - \bar{x}_{target}}{S_{CA}}\right)^2}$$

where:

n	=	number of samples required for statistical confidence
α	=	probability of a Type I Error (.05) (.10 - secondary)
β	=	probability of a Type II Error (.20)
FRL	=	the FRL for the given analyte
$\bar{x}_{target}$	=	target cleanup level average concentration = 75% of the FRL
S_{CA}	=	standard deviation estimated from clean areas (see discussion below)
$(Z_{1-\alpha} + Z_{1-\beta})^2$	=	the critical values for the normal distribution with probabilities $1-\alpha$ and $1-\beta$.

The target level prior to certification is assumed to be 75% of the FRL, i.e., the maximum expected value (average level) is no greater than 75% of the FRL.

An estimate of the variability(S_{ca}) for post-remedial conditions was based on estimates calculated from existing data in compliance with the FRLs. The concept was that the variability demonstrated in unimpacted areas would be similar to post-remedial conditions in impacted areas as well. The procedure used to estimate the clean area variability is as follows:

1. The site was divided into 100 ft. by 100 ft. blocks. This was accomplished by

simply dividing the Northing and Easting coordinate by 100 since these coordinates are presented in feet.

2. Block averages were calculated for all historic data within each 100x100 block for each COC evaluated.
3. Blocks were then categorized as either impacted (average greater than or equal to the FRL) or unimpacted (average less than the FRL).
4. All sample locations that were located in impacted blocks were then eliminated from consideration.
5. The final screening removed any individual sample that was in excess of three times the FRL since these sample values would immediately trigger a localized remedial effort.
6. From the data remaining (unimpacted areas), the variability used in the calculations was calculated.

This methodology was used to develop an estimate of post-remedial variability. Under these assumptions and methods, the estimated sample sizes are twelve for primary COCs and nine for secondary COCs. Table 3 provides the calculated sample sizes and estimated standard deviations used in the calculations.

Data Quality Objectives
Area 1 Phase 1 and On Site Disposal Cell (OSDF) Support Areas
Certification Sampling and Analysis

1A Task/Description: Certification Sampling Analysis

1.B. Project Phase: (Put an X in the appropriate selection.)

RI ☐ FS ☐ RD ☐ RA ☒ R,A ☐ OTHER

1.C. DQO No.: SL-023 DQO Reference No.: SL-027, SL-028

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2. Media Characterization: (Put an X in the appropriate selection.)

Air ☐ Biological ☐ Groundwater ☐ Sediment ☐ Soil ☒

Waste ☐ Wastewater ☐ Surface water ☐ Other (specify) _____

---

3. Data Use with Analytical Support Level (A-E): (Put an X in the appropriate Analytical Support Level selection(s) beside each applicable Data Use.)

Site Characterization
A ☐ B ☐ C ☐ D ☐ E ☐

Risk Assessment
A ☐ B ☐ C ☐ D ☐ E ☐

Evaluation of Alternatives
A ☐ B ☐ C ☐ D ☐ E ☐

Engineering Design
A ☐ B ☐ C ☐ D ☐ E ☐

Monitoring during remediation activities
A ☐ B ☐ C ☐ D ☐ E ☐

Other
A ☐ B ☐ C ☐ D ☒* E ☐ (Certification)

- **Radiochemistry data will be specified as ASL E in the task orders, to allow the HAMDCs to be tailored to the project requirements, however, since all other QC is identical to the ASL D specifications in the SCQ, it is referred to in this task order as ASL D*, to better connote the designated QC requirements**

4.A. Drivers: Area 1 Phase 1 Remedial Action Work Plan (RAWP), Applicable or Relevant and Appropriate Requirements (ARARs) and Operable Unit 5 Record of Decision (ROD)

4.B. Objective: Confirmation that excavation activities have remediated the site to below the Final Remediation Level (FRL) for area-specific constituents of concern.

5. Site Information (Description):

The OU2 and OU5 RODs have identified areas at the FEMP that require soil remediation activities. The RODs specify that the soils in these areas will be demonstrated to be below the FRLs. Certification will be necessary for areas of the site with soils that have been remediated to demonstrate that the residual soils do not contain contamination exceeding these levels at a specified confidence level.

6.A. Data Types with appropriate Analytical Support Level Equipment Selection and SCQ Reference: (Place an "X" to the right of the appropriate box or boxes selecting the type of analysis or analyses required. Then select the type of equipment to perform the analysis if appropriate. Please include a reference to the SCQ Section.)

1. pH	☐	2. Uranium	☒*	3. BTX	☐
Temperature	☐	Full Radiological	☒**	TPH	☐
Specific Conductance	☐	Metals	☒**	Oil/Grease	☐
Dissolved Oxygen	☐	Cyanide	☐		
Technetium-99	☐	Silica	☐		

4. Cations	☐	5. VOA	☐	6. Other (specify)
Anions	☐	BNA	☐	
TOC	☐	Pesticides	☐	
TCLP	☐	PCB	☒**	
CEC	☐			
COD	☐			

* Total Uranium calculated from sum of uranium isotopes analyzed in gamma spectroscopy.
** See Attached List.

6.B: Equipment Selection and SCQ Reference:

Equipment Selection	Refer to SCQ Section
ASL A _____	SCQ Section: _____
ASL B _____	SCQ Section:
ASL C _____	SCQ Section: _____
ASL D Per SCQ, PSP and Task Order	SCQ Section: APP. G, Table 1

ASL E _____ SCQ Section: _____

7.A. Sampling Methods: (Put an X in the appropriate selection.)

Biased	☐	Composite	☐	Environmental	☐	Grab	☒	Grid	☐
Intrusive	☒	Non-Intrusive	☐	Phased	☐	Source	☐		

DQO Number: SL-023

7.B: Sample Work Plan Reference: Project Specific Plan for Area 1 Phase 1 Remedial Action Work Plan (Project 50.03.40.01)

Background samples: OU5 RI

7.C: Sample Collection Reference:

Sample Collection Reference: PSP #50.03.40.01, SMPL-01

8: Quality Control Samples: (Place an "X" in the appropriate selection box.)

8.A: Field Quality Control Samples:

Trip Blanks	☐	Container Blanks	☐
Field Blanks	☐ **	Duplicate Samples	☒
Equipment Rinsate Samples	☐ **	Split Samples	☒ ***
Preservative Blanks	☐	Performance Evaluation Samples	☐

Other (specify)

** Limited rinsate sample(s) of the casings will be analyzed for metals and other applicable analytes of concern to provide a level of confidence that the casings are not a source of contaminants that would impact the levels of concern. Traditional field blanks will not be collected. Traditional rinsates will not be collected unless sampling equipment or shipping containers are reused.

*** Split samples will be collected where required.

8.B: Laboratory Quality Control Samples:

Method Blank	☒	Matrix Duplicate/Replicate	☒
Matrix Spike	☒	Surrogate Spikes	☒
Tracer Spike	☒		

Other (specify) _____

9. Other: Please provide any other germane information that may impact the data quality or gathering of this particular objective, task or data use.

Sample density will be dependent upon the class of Certification unit for an area. Proposed certification units will be identified in PSPs for each area.

TABLE 1
SUMMARY OF AREA 1 PHASE 1 AND OSDF SUPPORT AREAS CONSTITUENTS OF CONCERN*

Analytical Suites	Area 1, Phase I *Contaminants of Concern*	FRL or BTV or BG**
Primary COCs		
Gamma discernable radiological	Total uranium	82 mg/kg FRL
	Radium-226	1.7 pCi/g FRL
	Radium-228	1.8 pCi/g FRL
	Thorium-228	1.7 pCi/g FRL
	Thorium-232	1.5 pCi/g FRL
Secondary COCs		
Radiological COCs	Cesium-137	1.4 pCi/g FRL
	Thorium-230	280 pCi/g FRL
Metals	Arsenic	12 mg/kg FRL
	Beryllium	1.5 mg/kg FRL
Organics	Aroclor-1260	0.13 mg/kg FRL
	Aroclor-1254	0.13 mg/kg FRL
BTV COCs**		
Radiological COCs	Potassium-40	N/A***
Metals	Aluminum	10,103 mg/kg BTV****
	Molybdenum	10 mg/kg BTV

* Taken from Draft A1P1 RAWP, Rev. E, dated 11/96 (titled "A1P1 COCs")

** Data is collected for purposes of information only. These analytes are not remediation drivers in Area 1 Phase 1 and OSDF Support Areas

*** No FRL levels have been established for potassium-40. Analytical data will be used for QC purposes to indicate the overall efficiency and recovery of the analyses.

**** As used in the development of the FRLs, aluminum defaults to the 95th percentile of background (BG). BG for aluminum is 16,100 mg/kg.

TABLE 2
SUMMARY OF CERTIFICATION UNITS

Classification	Justification for Designation	Scale
Class I	Areas representing known or suspected ASCOC contamination prior to remediation	Not to exceed 1 acre
Class II	Areas representing inconsistent radiological contamination	Not to exceed 4 acres
Class III	Areas with no analytical data indicating site-introduced contamination and no production history of potential contamination	Not to exceed 16 acres

NOTE: Modification to dimensions of CUs will be necessary in some instances to "fit" irregularities of areas undergoing Certification. These modifications will be specified in the individual Removal Action Work Plans for approval.

TABLE 3
SUMMARY OF ESTIMATE OF NUMBER OF SAMPLES PER CERTIFICATION UNITS SITEWIDE TO ACHIEVE ACCEPTABLE CONFIDENCE LEVELS

ASCOC[1]	FRL	Number of Samples Used in Model	Standard Deviation	Maximum Expected Average Soil Concentration after Excavation [3]	Number of Samples Required
Aroclor-1254	0.13 mg/Kg	1036	0.034	0.098	5
Aroclor-1260	0.13 mg/Kg	641	0.035	0.098	8
Arsenic	12 mg/Kg	983	3.475	9.00	9
Beryllium	1.5 mg/Kg	999	0.397	1.12	7
Lead	400 mg/Kg	1149	43.478	300	2
Cesium-137	1.4 pCi/g	2595	0.381	1.05	8
Radium-226	1.7 pCi/g	2224	0.574	1.28	12
Radium-228	1.8 pCi/g	1508	0.441	1.35	6
Thorium-228	1.7 pCi/g	1514	0.471	1.28	8
Thorium-230	280 pCi/g	2034	29.472	210	2
Thorium-232	1.5 pCi/g	2258	0.503	1.12	12
Uranium, Total[2]	82 mg/Kg	4211	23.166	50.0 [4]	9

[1] Analytes which have FRLs only are listed, since BTVs will not drive remediation

[2] Total uranium will be calculated from the individual isotopes U_{234}, U_{235} U_{236} and U_{238}

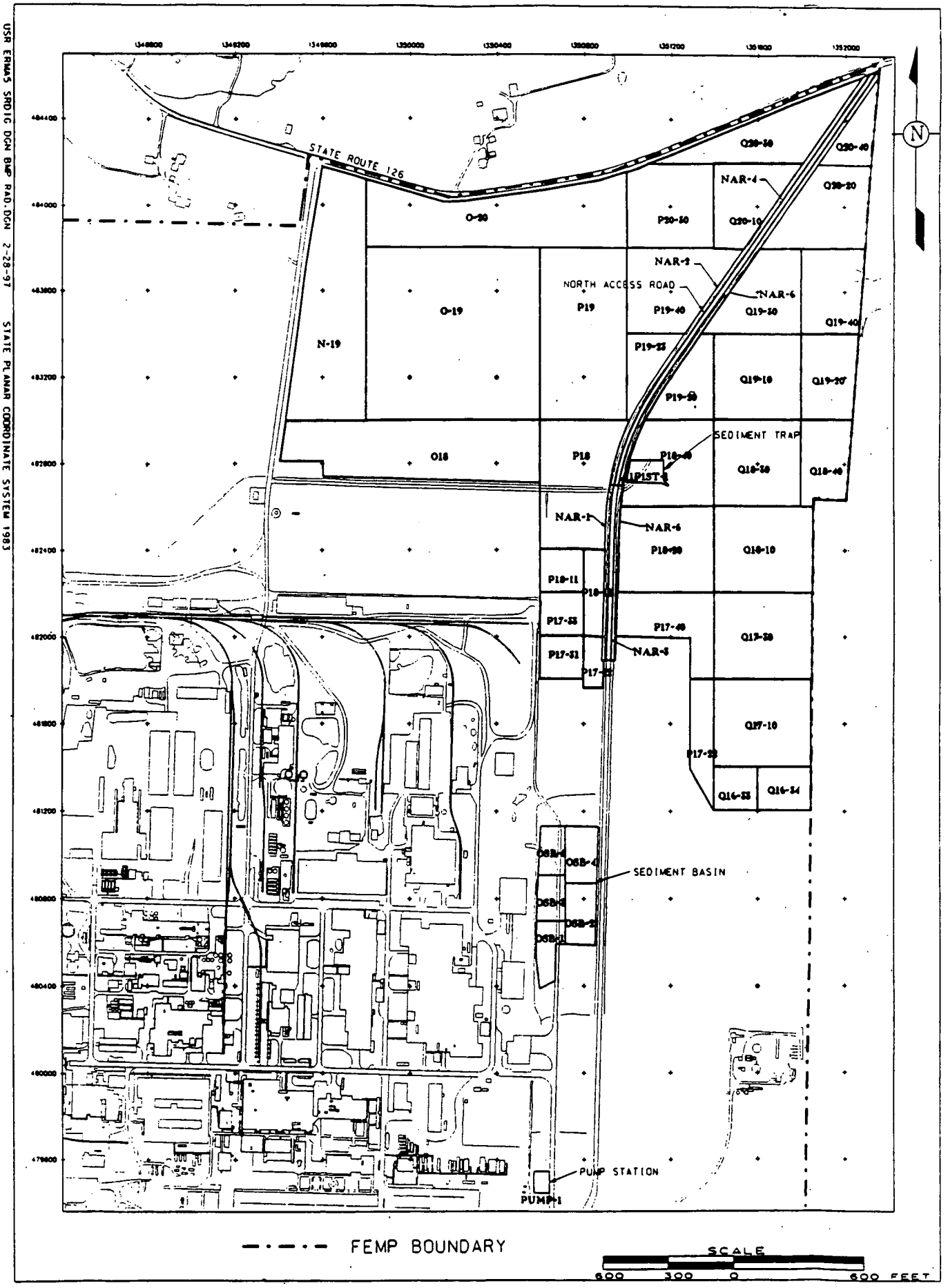
[3] Assumptions:
-Estimated average soil concentration after excavation is 75 percent of the FRL.
-Alpha = 0.05, beta = 0.2

[4] Uranium level is based on As Low As Reasonably Achievable (ALARA) goals. 75% of the FRL for total uranium is 61.5 mg/Kg

APPENDIX B

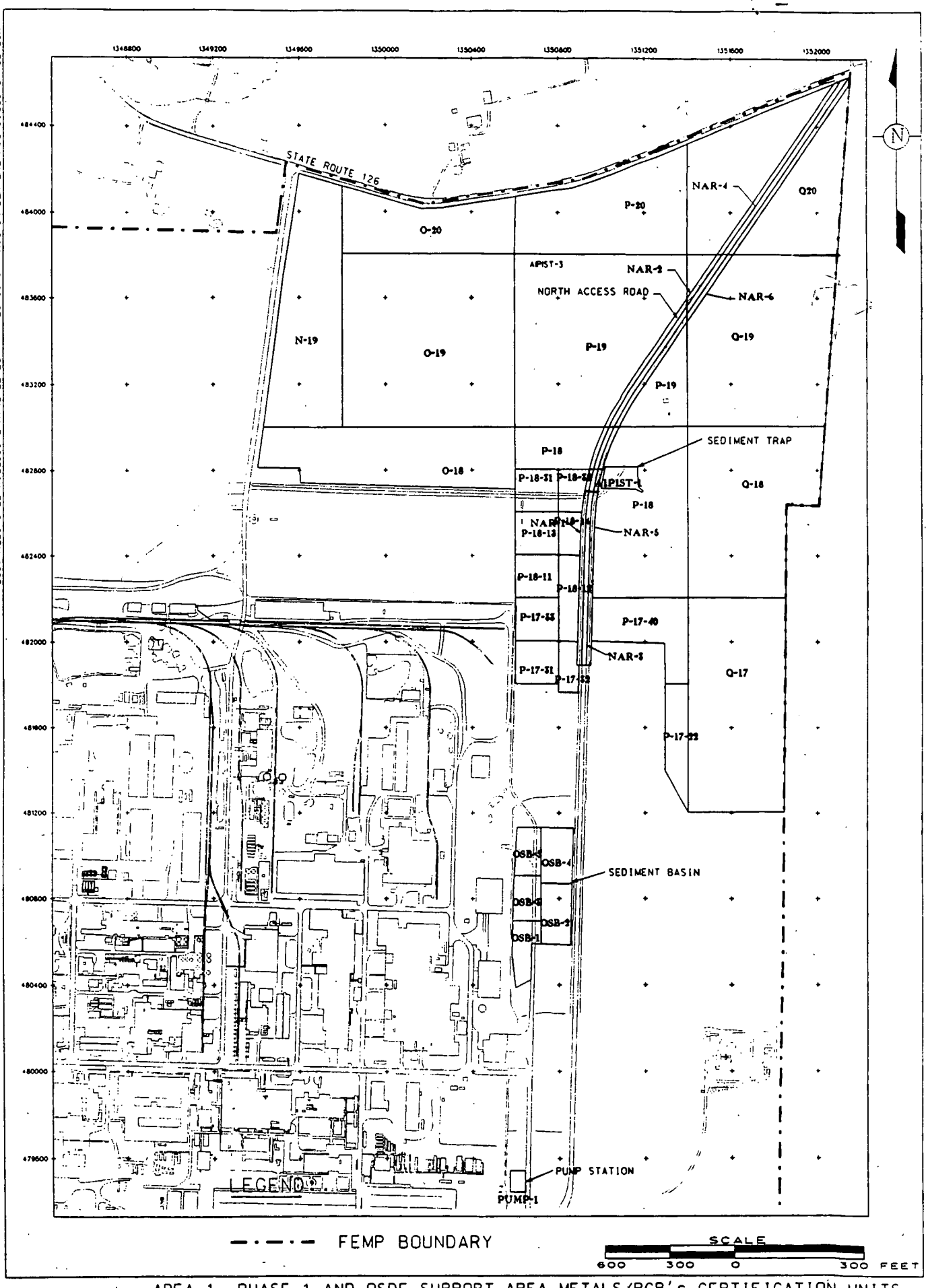
CERTIFICATION UNIT MAPS AND SAMPLE IDENTIFICATION NUMBERS

USR ERMAS SRDIG DGN BMP RAD.DGN 2-28-97 STATE PLANAR COORDINATE SYSTEM 1983



AREA 1, PHASE 1 AND OSDF SUPPORT AREAS RAD CERTIFICATION UNITS

USR ERMAS SRDIC DGN BMP METALS.DGN 2-28-97 STATE PLANAR COORDINATE SYSTEM 1983



AREA 1, PHASE 1 AND OSDF SUPPORT AREA METALS/PCB's CERTIFICATION UNITS

NORTH ACCESS ROAD
CERTIFICATION SAMPLES

3/4/97

STATION NUMBE	SAMPLE TYPE	EASTING 83	NORTHING 83	AREA NAME
NAR-1-10C-MP	Metals	1350915.089	482365.4015	A1P1 CERT
NAR-1-10C-MP	PCBs	1350915.089	482365.4015	A1P1 CERT
NAR-1-10C-R	Primary Rad	1350915.089	482365.4015	A1P1 CERT
NAR-1-11C-MP	Metals	1350914.055	482445.451	A1P1 CERT
NAR-1-11C-MP	PCBs	1350914.055	482445.451	A1P1 CERT
NAR-1-11C-R	Primary Rad	1350914.055	482445.451	A1P1 CERT
NAR-1-12C-MP	Metals	1350917.545	482465.3713	A1P1 CERT
NAR-1-12C-MP	PCBs	1350917.545	482465.3713	A1P1 CERT
NAR-1-12C-R	Primary Rad	1350917.545	482465.3713	A1P1 CERT
NAR-1-13C-MP	Metals	1350907.431	482537.9907	A1P1 CERT
NAR-1-13C-MP	PCBs	1350907.431	482537.9907	A1P1 CERT
NAR-1-13C-R	Primary Rad	1350907.431	482537.9907	A1P1 CERT
NAR-1-14C-MP	Metals	1350911.196	482571.5583	A1P1 CERT
NAR-1-14C-MP	PCBs	1350911.196	482571.5583	A1P1 CERT
NAR-1-14C-MP-D	Metals	1350911.196	482571.5583	A1P1 CERT
NAR-1-14C-MP-D	PCBs	1350911.196	482571.5583	A1P1 CERT
NAR-1-14C-R	Primary Rad	1350911.196	482571.5583	A1P1 CERT
NAR-1-14C-R-D	Primary Rad	1350911.196	482571.5583	A1P1 CERT
NAR-1-15C-MP	Metals	1350911.322	482628.0461	A1P1 CERT
NAR-1-15C-MP	PCBs	1350911.322	482628.0461	A1P1 CERT
NAR-1-15C-R	Primary Rad	1350911.322	482628.0461	A1P1 CERT
NAR-1-16C-MP	Metals	1350932.283	482683.7835	A1P1 CERT
NAR-1-16C-MP	PCBs	1350932.283	482683.7835	A1P1 CERT
NAR-1-16C-R	Primary Rad	1350932.283	482683.7835	A1P1 CERT
NAR-1-1C-MP	Metals	1350901.875	481949.6006	A1P1 CERT
NAR-1-1C-MP	PCBs	1350901.875	481949.6006	A1P1 CERT
NAR-1-1C-R	Primary Rad	1350901.875	481949.6006	A1P1 CERT
NAR-1-2C-MP	Metals	1350897.073	481957.721	A1P1 CERT
NAR-1-2C-MP	PCBs	1350897.073	481957.721	A1P1 CERT
NAR-1-2C-R	Primary Rad	1350897.073	481957.721	A1P1 CERT
NAR-1-3C-MP	Metals	1350898.988	482035.6974	A1P1 CERT
NAR-1-3C-MP	PCBs	1350898.988	482035.6974	A1P1 CERT
NAR-1-3C-R	Primary Rad	1350898.988	482035.6974	A1P1 CERT
NAR-1-4C-MP	Metals	1350905.6	482060.5426	A1P1 CERT
NAR-1-4C-MP	PCBs	1350905.6	482060.5426	A1P1 CERT
NAR-1-4C-R	Primary Rad	1350905.6	482060.5426	A1P1 CERT
NAR-1-5C-MP	Metals	1350896.617	482142.7879	A1P1 CERT
NAR-1-5C-MP	PCBs	1350896.617	482142.7879	A1P1 CERT
NAR-1-5C-R	Primary Rad	1350896.617	482142.7879	A1P1 CERT
NAR-1-6C-MP	Metals	1350896.912	482154.7843	A1P1 CERT
NAR-1-6C-MP	PCBs	1350896.912	482154.7843	A1P1 CERT
NAR-1-6C-R	Primary Rad	1350896.912	482154.7843	A1P1 CERT
NAR-1-7C-MP	Metals	1350896.558	482221.8132	A1P1 CERT
NAR-1-7C-MP	PCBs	1350896.558	482221.8132	A1P1 CERT
NAR-1-7C-R	Primary Rad	1350896.558	482221.8132	A1P1 CERT
NAR-1-8C-MP	Metals	1350907.611	482264.5547	A1P1 CERT
NAR-1-8C-MP	PCBs	1350907.611	482264.5547	A1P1 CERT
NAR-1-8C-R	Primary Rad	1350907.611	482264.5547	A1P1 CERT
NAR-1-9C-MP	Metals	1350908.551	482343.5554	A1P1 CERT
NAR-1-9C-MP	PCBs	1350908.551	482343.5554	A1P1 CERT
NAR-1-9C-R	Primary Rad	1350908.551	482343.5554	A1P1 CERT

3/4/97

NORTH ACCESS ROAD
CERTIFICATION SAMPLES
(continued)

STATION NUMBE	SAMPLE TYPE	EASTING 83	NORTHING 83	AREA NAME
NAR-2-10C-M	Metals	1351553.221	483799.5633	A1P1 CERT
NAR-2-10C-R	Primary Rad	1351553.221	483799.5633	A1P1 CERT
NAR-2-11C-M	Metals	1351639.166	483938.1938	A1P1 CERT
NAR-2-11C-R	Primary Rad	1351639.166	483938.1938	A1P1 CERT
NAR-2-12C-M	Metals	1351774.377	484123.2343	A1P1 CERT
NAR-2-12C-R	Primary Rad	1351774.377	484123.2343	A1P1 CERT
NAR-2-13C-M	Metals	1351829.084	484215.387	A1P1 CERT
NAR-2-13C-R	Primary Rad	1351829.084	484215.387	A1P1 CERT
NAR-2-14C-M	Metals	1351925.628	484369.7868	A1P1 CERT
NAR-2-14C-R	Primary Rad	1351925.628	484369.7868	A1P1 CERT
NAR-2-15C-M	Metals	1351959.057	484408.7678	A1P1 CERT
NAR-2-15C-R	Primary Rad	1351959.057	484408.7678	A1P1 CERT
NAR-2-16C-M	Metals	1352051.628	484539.3302	A1P1 CERT
NAR-2-16C-R	Primary Rad	1352051.628	484539.3302	A1P1 CERT
NAR-2-1C-M	Metals	1350954.267	482786.4613	A1P1 CERT
NAR-2-1C-R	Primary Rad	1350954.267	482786.4613	A1P1 CERT
NAR-2-2C-M	Metals	1351017.585	482960.4403	A1P1 CERT
NAR-2-2C-R	Primary Rad	1351017.585	482960.4403	A1P1 CERT
NAR-2-3C-M	Metals	1351061.356	483053.9322	A1P1 CERT
NAR-2-3C-R	Primary Rad	1351061.356	483053.9322	A1P1 CERT
NAR-2-4C-M	Metals	1351147.75	483202.49	A1P1 CERT
NAR-2-4C-R	Primary Rad	1351147.75	483202.49	A1P1 CERT
NAR-2-5C-M	Metals	1351190.106	483266.4701	A1P1 CERT
NAR-2-5C-M-D	Metals	1351190.106	483266.4701	A1P1 CERT
NAR-2-5C-R	Primary Rad	1351190.106	483266.4701	A1P1 CERT
NAR-2-5C-R-D	Primary Rad	1351190.106	483266.4701	A1P1 CERT
NAR-2-6C-M	Metals	1351292.174	483414.7473	A1P1 CERT
NAR-2-6C-R	Primary Rad	1351292.174	483414.7473	A1P1 CERT
NAR-2-7C-M	Metals	1351352.936	483494.3964	A1P1 CERT
NAR-2-7C-R	Primary Rad	1351352.936	483494.3964	A1P1 CERT
NAR-2-8C-M	Metals	1351433.806	483611.1352	A1P1 CERT
NAR-2-8C-R	Primary Rad	1351433.806	483611.1352	A1P1 CERT
NAR-2-9C-M	Metals	1351523.629	483748.3643	A1P1 CERT
NAR-2-9C-R	Primary Rad	1351523.629	483748.3643	A1P1 CERT

NORTH ACCESS ROAD
CERTIFICATION SAMPLES
(continued)

STATION NUMBE	SAMPLE TYPE	EASTING 83	NORTHING 83	AREA NAME
NAR-3-10C-M	Metals	1350933.82	482394.9504	A1P1 CERT
NAR-3-10C-R	Primary Rad	1350933.82	482394.9504	A1P1 CERT
NAR-3-11C-M	Metals	1350936.557	482424.8923	A1P1 CERT
NAR-3-11C-R	Primary Rad	1350936.557	482424.8923	A1P1 CERT
NAR-3-12C-M	Metals	1350925.378	482499.1892	A1P1 CERT
NAR-3-12C-R	Primary Rad	1350925.378	482499.1892	A1P1 CERT
NAR-3-13C-M	Metals	1350940.65	482542.6941	A1P1 CERT
NAR-3-13C-R	Primary Rad	1350940.65	482542.6941	A1P1 CERT
NAR-3-14C-M	Metals	1350935.271	482597.0519	A1P1 CERT
NAR-3-14C-R	Primary Rad	1350935.271	482597.0519	A1P1 CERT
NAR-3-15C-M	Metals	1350949.769	482629.6041	A1P1 CERT
NAR-3-15C-R	Primary Rad	1350949.769	482629.6041	A1P1 CERT
NAR-3-16C-M	Metals	1350946.431	482677.3756	A1P1 CERT
NAR-3-16C-R	Primary Rad	1350946.431	482677.3756	A1P1 CERT
NAR-3-1C-M	Metals	1350911.323	481901.5032	A1P1 CERT
NAR-3-1C-R	Primary Rad	1350911.323	481901.5032	A1P1 CERT
NAR-3-2C-M	Metals	1350913.075	481998.3403	A1P1 CERT
NAR-3-2C-R	Primary Rad	1350913.075	481998.3403	A1P1 CERT
NAR-3-3C-M	Metals	1350924.563	482018.0641	A1P1 CERT
NAR-3-3C-M-D	Metals	1350924.563	482018.0641	A1P1 CERT
NAR-3-3C-R	Primary Rad	1350924.563	482018.0641	A1P1 CERT
NAR-3-3C-R-D	Primary Rad	1350924.563	482018.0641	A1P1 CERT
NAR-3-4C-M	Metals	1350928.159	482082.9954	A1P1 CERT
NAR-3-4C-R	Primary Rad	1350928.159	482082.9954	A1P1 CERT
NAR-3-5C-M	Metals	1350928.288	482129.0061	A1P1 CERT
NAR-3-5C-R	Primary Rad	1350928.288	482129.0061	A1P1 CERT
NAR-3-6C-M	Metals	1350929.88	482194.31	A1P1 CERT
NAR-3-6C-R	Primary Rad	1350929.88	482194.31	A1P1 CERT
NAR-3-7C-M	Metals	1350931.253	482208.9574	A1P1 CERT
NAR-3-7C-R	Primary Rad	1350931.253	482208.9574	A1P1 CERT
NAR-3-8C-M	Metals	1350925.072	482283.1315	A1P1 CERT
NAR-3-8C-R	Primary Rad	1350925.072	482283.1315	A1P1 CERT
NAR-3-9C-M	Metals	1350927.563	482303.0764	A1P1 CERT
NAR-3-9C-R	Primary Rad	1350927.563	482303.0764	A1P1 CERT

NORTH ACCESS ROAD
CERTIFICATION SAMPLES
(continued)

3/4/97

STATION NUMBE	SAMPLE TYPE	EASTING 83	NORTHING 83	AREA NAME
NAR-4-10C-M	Metals	1351625.942	483888.0427	A1P1 CERT
NAR-4-10C-R	Primary Rad	1351625.942	483888.0427	A1P1 CERT
NAR-4-11C-M	Metals	1351719.004	484001.4075	A1P1 CERT
NAR-4-11C-R	Primary Rad	1351719.004	484001.4075	A1P1 CERT
NAR-4-12C-M	Metals	1351726.337	484033.8301	A1P1 CERT
NAR-4-12C-R	Primary Rad	1351726.337	484033.8301	A1P1 CERT
NAR-4-13C-M	Metals	1351871.098	484251.0076	A1P1 CERT
NAR-4-13C-R	Primary Rad	1351871.098	484251.0076	A1P1 CERT
NAR-4-14C-M	Metals	1351962.772	484364.1002	A1P1 CERT
NAR-4-14C-R	Primary Rad	1351962.772	484364.1002	A1P1 CERT
NAR-4-15C-M	Metals	1352022.745	484455.1237	A1P1 CERT
NAR-4-15C-R	Primary Rad	1352022.745	484455.1237	A1P1 CERT
NAR-4-16C-MV	Metals	1352072.391	484528.9902	A1P1 CERT
NAR-4-16C-R	Primary Rad	1352072.391	484528.9902	A1P1 CERT
NAR-4-1C-M	Metals	1350966.697	482790.5087	A1P1 CERT
NAR-4-1C-R	Primary Rad	1350966.697	482790.5087	A1P1 CERT
NAR-4-2C-M	Metals	1351002.283	482863.1935	A1P1 CERT
NAR-4-2C-R	Primary Rad	1351002.283	482863.1935	A1P1 CERT
NAR-4-3C-M	Metals	1351049.188	483002.3557	A1P1 CERT
NAR-4-3C-R	Primary Rad	1351049.188	483002.3557	A1P1 CERT
NAR-4-4C-M	Metals	1351160.27	483181.3	A1P1 CERT
NAR-4-4C-R	Primary Rad	1351160.27	483181.3	A1P1 CERT
NAR-4-5C-M	Metals	1351208.052	483244.7692	A1P1 CERT
NAR-4-5C-R	Primary Rad	1351208.052	483244.7692	A1P1 CERT
NAR-4-6C-M	Metals	1351292.922	483392.5563	A1P1 CERT
NAR-4-6C-R	Primary Rad	1351292.922	483392.5563	A1P1 CERT
NAR-4-7C-M	Metals	1351342.8	483454.2185	A1P1 CERT
NAR-4-7C-R	Primary Rad	1351342.8	483454.2185	A1P1 CERT
NAR-4-8C-M	Metals	1351429.602	483599.5022	A1P1 CERT
NAR-4-8C-R	Primary Rad	1351429.602	483599.5022	A1P1 CERT
NAR-4-9C-M	Metals	1351514.61	483704.32	A1P1 CERT
NAR-4-9C-M-D	Metals	1351514.61	483704.32	A1P1 CERT
NAR-4-9C-R	Primary Rad	1351514.61	483704.32	A1P1 CERT
NAR-4-9C-R-D	Primary Rad	1351514.61	483704.32	A1P1 CERT

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NORTH ACCESS ROAD
CERTIFICATION SAMPLES
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STATION NUMBE	SAMPLE TYPE	EASTING 83	NORTHING 83	AREA NAME
NAR-5-10C-M	Metals	1350957.911	482398.3599	A1P1 CERT
NAR-5-10C-R	Primary Rad	1350957.911	482398.3599	A1P1 CERT
NAR-5-11C-M	Metals	1350949.209	482410.5773	A1P1 CERT
NAR-5-11C-R	Primary Rad	1350949.209	482410.5773	A1P1 CERT
NAR-5-12C-M	Metals	1350955.221	482492.4543	A1P1 CERT
NAR-5-12C-R	Primary Rad	1350955.221	482492.4543	A1P1 CERT
NAR-5-13C-M	Metals	1350955.712	482512.4483	A1P1 CERT
NAR-5-13C-R	Primary Rad	1350955.712	482512.4483	A1P1 CERT
NAR-5-14C-M	Metals	1350959.419	482557.5465	A1P1 CERT
NAR-5-14C-R	Primary Rad	1350959.419	482557.5465	A1P1 CERT
NAR-5-15C-M	Metals	1350967.639	482627.4481	A1P1 CERT
NAR-5-15C-R	Primary Rad	1350967.639	482627.4481	A1P1 CERT
NAR-5-16C-M	Metals	1350965.626	482664.3026	A1P1 CERT
NAR-5-16C-R	Primary Rad	1350965.626	482664.3026	A1P1 CERT
NAR-5-1C-M	Metals	1350943.806	481905.5577	A1P1 CERT
NAR-5-1C-M-D	Metals	1350943.806	481905.5577	A1P1 CERT
NAR-5-1C-R	Primary Rad	1350943.806	481905.5577	A1P1 CERT
NAR-5-1C-R-D	Primary Rad	1350943.806	481905.5577	A1P1 CERT
NAR-5-2C-M	Metals	1350935.889	481949.7654	A1P1 CERT
NAR-5-2C-R	Primary Rad	1350935.889	481949.7654	A1P1 CERT
NAR-5-3C-M	Metals	1350942.607	482019.6215	A1P1 CERT
NAR-5-3C-R	Primary Rad	1350942.607	482019.6215	A1P1 CERT
NAR-5-4C-M	Metals	1350946.497	482096.5492	A1P1 CERT
NAR-5-4C-R	Primary Rad	1350946.497	482096.5492	A1P1 CERT
NAR-5-5C-M	Metals	1350947.791	482108.521	A1P1 CERT
NAR-5-5C-R	Primary Rad	1350947.791	482108.521	A1P1 CERT
NAR-5-6C-M	Metals	1350936.907	482194.8143	A1P1 CERT
NAR-5-6C-R	Primary Rad	1350936.907	482194.8143	A1P1 CERT
NAR-5-7C-M	Metals	1350950.32	482211.49	A1P1 CERT
NAR-5-7C-R	Primary Rad	1350950.32	482211.49	A1P1 CERT
NAR-5-8C-M	Metals	1350947.476	482258.574	A1P1 CERT
NAR-5-8C-R	Primary Rad	1350947.476	482258.574	A1P1 CERT
NAR-5-9C-M	Metals	1350949.416	482337.5502	A1P1 CERT
NAR-5-9C-R	Primary Rad	1350949.416	482337.5502	A1P1 CERT

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NORTH ACCESS ROAD
CERTIFICATION SAMPLES
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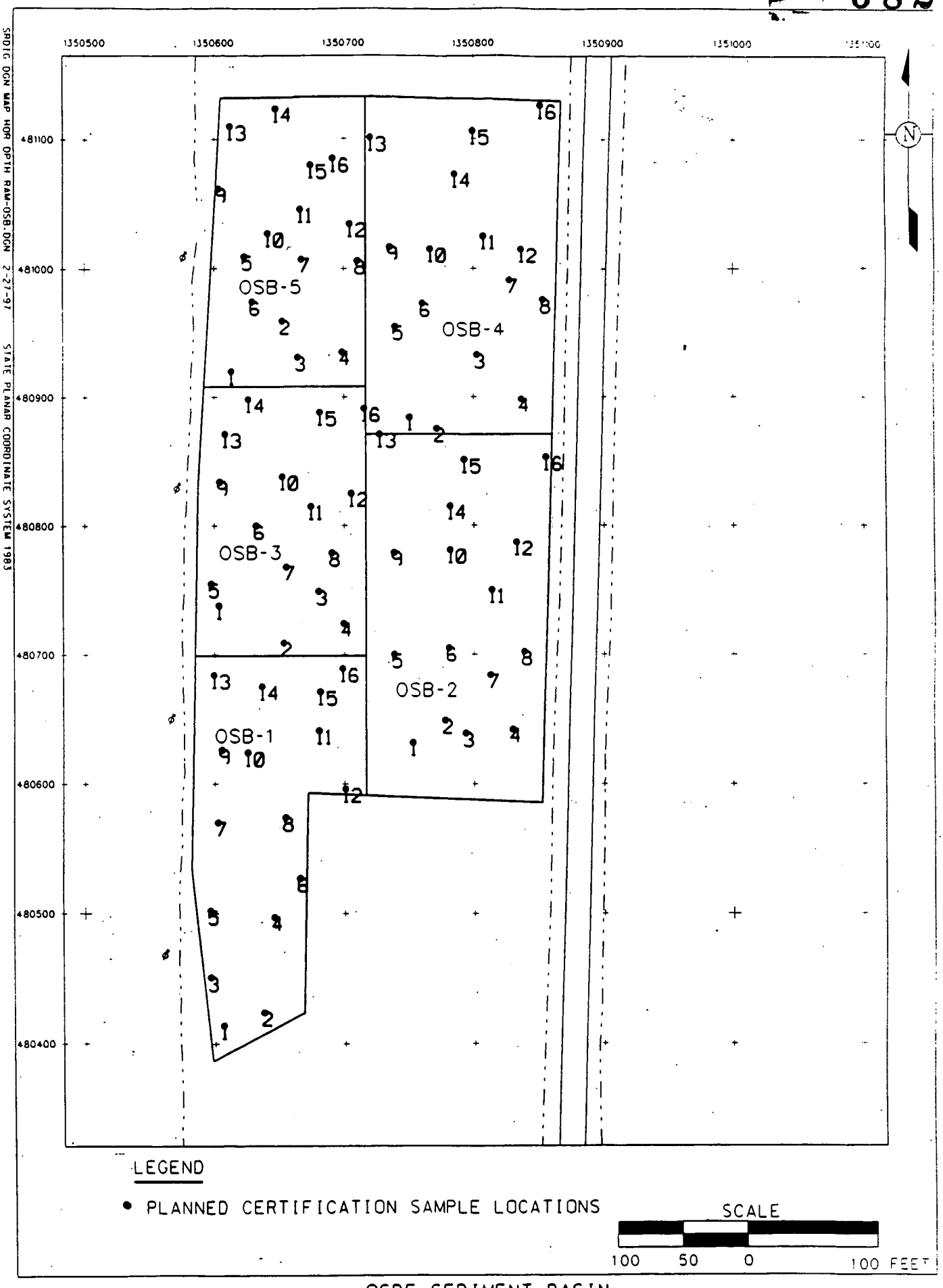
STATION NUMBE	SAMPLE TYPE	EASTING 83	NORTHING 83	AREA NAME
NAR-6-10C-M	Metals	1351639.426	483859.7022	A1P1 CERT
NAR-6-10C-R	Primary Rad	1351639.426	483859.7022	A1P1 CERT
NAR-6-11C-M	Metals	1351692.46	483949.365	A1P1 CERT
NAR-6-11C-R	Primary Rad	1351692.46	483949.365	A1P1 CERT
NAR-6-12C-M	Metals	1351798.093	484086.8121	A1P1 CERT
NAR-6-12C-R	Primary Rad	1351798.093	484086.8121	A1P1 CERT
NAR-6-13C-M	Metals	1351873.466	484216.8844	A1P1 CERT
NAR-6-13C-R	Primary Rad	1351873.466	484216.8844	A1P1 CERT
NAR-6-14C-M	Metals	1351973.017	484359.6241	A1P1 CERT
NAR-6-14C-R	Primary Rad	1351973.017	484359.6241	A1P1 CERT
NAR-6-15C-M	Metals	1352069.738	484487.3974	A1P1 CERT
NAR-6-15C-R	Primary Rad	1352069.738	484487.3974	A1P1 CERT
NAR-6-16C-M	Metals	1352080.078	484508.1599	A1P1 CERT
NAR-6-16C-M-D	Metals	1352080.078	484508.1599	A1P1 CERT
NAR-6-16C-R	Primary Rad	1352080.078	484508.1599	A1P1 CERT
NAR-6-16C-R-D	Primary Rad	1352080.078	484508.1599	A1P1 CERT
NAR-6-1C-M	Metals	1350979.533	482702.3273	A1P1 CERT
NAR-6-1C-R	Primary Rad	1350979.533	482702.3273	A1P1 CERT
NAR-6-2C-M	Metals	1351029.091	482893.3823	A1P1 CERT
NAR-6-2C-R	Primary Rad	1351029.091	482893.3823	A1P1 CERT
NAR-6-3C-M	Metals	1351075.1	483013.78	A1P1 CERT
NAR-6-3C-R	Primary Rad	1351075.1	483013.78	A1P1 CERT
NAR-6-4C-M	Metals	1351144.087	483122.7072	A1P1 CERT
NAR-6-4C-R	Primary Rad	1351144.087	483122.7072	A1P1 CERT
NAR-6-5C-M	Metals	1351260.937	483294.7712	A1P1 CERT
NAR-6-5C-R	Primary Rad	1351260.937	483294.7712	A1P1 CERT
NAR-6-6C-M	Metals	1351282.733	483337.9563	A1P1 CERT
NAR-6-6C-R	Primary Rad	1351282.733	483337.9563	A1P1 CERT
NAR-6-7C-M	Metals	1351373.073	483465.1988	A1P1 CERT
NAR-6-7C-R	Primary Rad	1351373.073	483465.1988	A1P1 CERT
NAR-6-8C-M	Metals	1351460.691	483606.3192	A1P1 CERT
NAR-6-8C-R	Primary Rad	1351460.691	483606.3192	A1P1 CERT
NAR-6-9C-M	Metals	1351520.936	483695.9549	A1P1 CERT
NAR-6-9C-R	Primary Rad	1351520.936	483695.9549	A1P1 CERT



OSDF SEDIMENT BASIN

OSDF SEDIMENT BASIN
CERTIFICATION SAMPLES

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STATION NUMBE	SAMPLE TYPE	EASTING 83	NORTHING 83	AREA NAME
OSB-1C-1-MP	Metals	1350605	480414	A1P1 CERT
OSB-1C-1-MP	PCBs	1350605	480414	A1P1 CERT
OSB-1C-1-R	Primary Rad	1350605	480414	A1P1 CERT
OSB-1C-10-MP	Metals	1350624	480624	A1P1 CERT
OSB-1C-10-MP	PCBs	1350624	480624	A1P1 CERT
OSB-1C-10-R	Primary Rad	1350624	480624	A1P1 CERT
OSB-1C-11-MP	Metals	1350679	480641	A1P1 CERT
OSB-1C-11-MP	PCBs	1350679	480641	A1P1 CERT
OSB-1C-11-R	Primary Rad	1350679	480641	A1P1 CERT
OSB-1C-12-MP	Metals	1350699	480596	A1P1 CERT
OSB-1C-12-MP	PCBs	1350699	480596	A1P1 CERT
OSB-1C-12-R	Primary Rad	1350699	480596	A1P1 CERT
OSB-1C-13-MP	Metals	1350598	480684	A1P1 CERT
OSB-1C-13-MP	PCBs	1350598	480684	A1P1 CERT
OSB-1C-13-R	Primary Rad	1350598	480684	A1P1 CERT
OSB-1C-14-MP	Metals	1350635	480675	A1P1 CERT
OSB-1C-14-MP	PCBs	1350635	480675	A1P1 CERT
OSB-1C-14-R	Primary Rad	1350635	480675	A1P1 CERT
OSB-1C-15-MP	Metals	1350680	480671	A1P1 CERT
OSB-1C-15-MP	PCBs	1350680	480671	A1P1 CERT
OSB-1C-15-R	Primary Rad	1350680	480671	A1P1 CERT
OSB-1C-16-MP	Metals	1350697	480689	A1P1 CERT
OSB-1C-16-MP	PCBs	1350697	480689	A1P1 CERT
OSB-1C-16-RV	Primary Rad	1350697	480689	A1P1 CERT
OSB-1C-2-MP	Metals	1350636	480424	A1P1 CERT
OSB-1C-2-MP	PCBs	1350636	480424	A1P1 CERT
OSB-1C-2-R	Primary Rad	1350636	480424	A1P1 CERT
OSB-1C-3-MP	Metals	1350595	480451	A1P1 CERT
OSB-1C-3-MP	PCBs	1350595	480451	A1P1 CERT
OSB-1C-3-RV	Primary Rad	1350595	480451	A1P1 CERT
OSB-1C-4-MP	Metals	1350644	480497	A1P1 CERT
OSB-1C-4-MP	PCBs	1350644	480497	A1P1 CERT
OSB-1C-4-RV	Primary Rad	1350644	480497	A1P1 CERT
OSB-1C-5-MP	Metals	1350595	480502	A1P1 CERT
OSB-1C-5-MP	PCBs	1350595	480502	A1P1 CERT
OSB-1C-5-MP-DUP	Metals	1350595	480502	A1P1 CERT
OSB-1C-5-MP-DUP	PCBs	1350595	480502	A1P1 CERT
OSB-1C-5-R	Primary Rad	1350595	480502	A1P1 CERT
OSB-1C-5-R-DUP	Primary Rad	1350595	480502	A1P1 CERT
OSB-1C-6-MP	Metals	1350664	480527	A1P1 CERT
OSB-1C-6-MP	PCBs	1350664	480527	A1P1 CERT
OSB-1C-6-R	Primary Rad	1350664	480527	A1P1 CERT
OSB-1C-7-MP	Metals	1350601	480570	A1P1 CERT
OSB-1C-7-MP	PCBs	1350601	480570	A1P1 CERT
OSB-1C-7-RV	Primary Rad	1350601	480570	A1P1 CERT
OSB-1C-8-MP	Metals	1350653	480574	A1P1 CERT
OSB-1C-8-MP	PCBs	1350653	480574	A1P1 CERT
OSB-1C-8-R	Primary Rad	1350653	480574	A1P1 CERT
OSB-1C-9-MP	Metals	1350604	480626	A1P1 CERT
OSB-1C-9-MP	PCBs	1350604	480626	A1P1 CERT
OSB-1C-9-R	Primary Rad	1350604	480626	A1P1 CERT

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OSDF SEDIMENT BASIN
CERTIFICATION SAMPLES (continued)

STATION NUMBE	SAMPLE TYPE	EASTING 83	NORTHING 83	AREA NAME
OSB-2C-1-MP	Metals	1350751	480632	A1P1 CERT
OSB-2C-1-MP	PCBs	1350751	480632	A1P1 CERT
OSB-2C-1-R	Primary Rad	1350751	480632	A1P1 CERT
OSB-2C-10-MP	Metals	1350780	480781	A1P1 CERT
OSB-2C-10-MP	PCBs	1350780	480781	A1P1 CERT
OSB-2C-10-R	Primary Rad	1350780	480781	A1P1 CERT
OSB-2C-11-MP	Metals	1350812	480750	A1P1 CERT
OSB-2C-11-MP	PCBs	1350812	480750	A1P1 CERT
OSB-2C-11-R	Primary Rad	1350812	480750	A1P1 CERT
OSB-2C-12-MP	Metals	1350831	480787	A1P1 CERT
OSB-2C-12-MP	PCBs	1350831	480787	A1P1 CERT
OSB-2C-12-RV	Primary Rad	1350831	480787	A1P1 CERT
OSB-2C-13-MP	Metals	1350726	480871	A1P1 CERT
OSB-2C-13-MP	PCBs	1350726	480871	A1P1 CERT
OSB-2C-13-R	Primary Rad	1350726	480871	A1P1 CERT
OSB-2C-14-MP	Metals	1350780	480815	A1P1 CERT
OSB-2C-14-MP	PCBs	1350780	480815	A1P1 CERT
OSB-2C-14-R	Primary Rad	1350780	480815	A1P1 CERT
OSB-2C-15-MP	Metals	1350791	480851	A1P1 CERT
OSB-2C-15-MP	PCBs	1350791	480851	A1P1 CERT
OSB-2C-15-RV	Primary Rad	1350791	480851	A1P1 CERT
OSB-2C-16-MP	Metals	1350854	480853	A1P1 CERT
OSB-2C-16-MP	PCBs	1350854	480853	A1P1 CERT
OSB-2C-16-R	Primary Rad	1350854	480853	A1P1 CERT
OSB-2C-2-MP	Metals	1350776	480649	A1P1 CERT
OSB-2C-2-MP	PCBs	1350776	480649	A1P1 CERT
OSB-2C-2-R	Primary Rad	1350776	480649	A1P1 CERT
OSB-2C-3-MP	Metals	1350792	480639	A1P1 CERT
OSB-2C-3-MP	PCBs	1350792	480639	A1P1 CERT
OSB-2C-3-RV	Primary Rad	1350792	480639	A1P1 CERT
OSB-2C-4-MP	Metals	1350828	480642	A1P1 CERT
OSB-2C-4-MP	PCBs	1350828	480642	A1P1 CERT
OSB-2C-4-R	Primary Rad	1350828	480642	A1P1 CERT
OSB-2C-5-MP	Metals	1350737	480700	A1P1 CERT
OSB-2C-5-MP	PCBs	1350737	480700	A1P1 CERT
OSB-2C-5-RV	Primary Rad	1350737	480700	A1P1 CERT
OSB-2C-6-MP	Metals	1350779	480705	A1P1 CERT
OSB-2C-6-MP	PCBs	1350779	480705	A1P1 CERT
OSB-2C-6-R	Primary Rad	1350779	480705	A1P1 CERT
OSB-2C-7-MP	Metals	1350811	480684	A1P1 CERT
OSB-2C-7-MP	PCBs	1350811	480684	A1P1 CERT
OSB-2C-7-R	Primary Rad	1350811	480684	A1P1 CERT
OSB-2C-8-MP	Metals	1350837	480702	A1P1 CERT
OSB-2C-8-MP	PCBs	1350837	480702	A1P1 CERT
OSB-2C-8-MP-DUP	Metals	1350837	480702	A1P1 CERT
OSB-2C-8-MP-DUP	PCBs	1350837	480702	A1P1 CERT
OSB-2C-8-R	Primary Rad	1350837	480702	A1P1 CERT
OSB-2C-8-R-DUP	Primary Rad	1350837	480702	A1P1 CERT
OSB-2C-9-MP	Metals	1350737	480779	A1P1 CERT
OSB-2C-9-MP	PCBs	1350737	480779	A1P1 CERT
OSB-2C-9-R	Primary Rad	1350737	480779	A1P1 CERT

OSDF SEDIMENT BASIN
CERTIFICATION SAMPLES (continued)

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STATION NUMBE	SAMPLE TYPE	EASTING 83	NORTHING 83	AREA NAME
OSB-3C-1-MP	Metals	1350602	480738	A1P1 CERT
OSB-3C-1-MP	PCBs	1350602	480738	A1P1 CERT
OSB-3C-1-R	Primary Rad	1350602	480738	A1P1 CERT
OSB-3C-10-MP	Metals	1350651	480838	A1P1 CERT
OSB-3C-10-MP	PCBs	1350651	480838	A1P1 CERT
OSB-3C-10-R	Primary Rad	1350651	480838	A1P1 CERT
OSB-3C-11-MP	Metals	1350673	480815	A1P1 CERT
OSB-3C-11-MP	PCBs	1350673	480815	A1P1 CERT
OSB-3C-11-RV	Primary Rad	1350673	480815	A1P1 CERT
OSB-3C-12-MP	Metals	1350704	480825	A1P1 CERT
OSB-3C-12-MP	PCBs	1350704	480825	A1P1 CERT
OSB-3C-12-MP-DU	Metals	1350704	480825	A1P1 CERT
OSB-3C-12-MP-DU	PCBs	1350704	480825	A1P1 CERT
OSB-3C-12-R	Primary Rad	1350704	480825	A1P1 CERT
OSB-3C-12-R-DUP	Primary Rad	1350704	480825	A1P1 CERT
OSB-3C-13-MP	Metals	1350607	480871	A1P1 CERT
OSB-3C-13-MP	PCBs	1350607	480871	A1P1 CERT
OSB-3C-13-R	Primary Rad	1350607	480871	A1P1 CERT
OSB-3C-14-MP	Metals	1350625	480898	A1P1 CERT
OSB-3C-14-MP	PCBs	1350625	480898	A1P1 CERT
OSB-3C-14-RV	Primary Rad	1350625	480898	A1P1 CERT
OSB-3C-15-MP	Metals	1350680	480888	A1P1 CERT
OSB-3C-15-MP	PCBs	1350680	480888	A1P1 CERT
OSB-3C-15-RV	Primary Rad	1350680	480888	A1P1 CERT
OSB-3C-16-MP	Metals	1350714	480891	A1P1 CERT
OSB-3C-16-MP	PCBs	1350714	480891	A1P1 CERT
OSB-3C-16-R	Primary Rad	1350714	480891	A1P1 CERT
OSB-3C-2-MP	Metals	1350652	480709	A1P1 CERT
OSB-3C-2-MP	PCBs	1350652	480709	A1P1 CERT
OSB-3C-2-R	Primary Rad	1350652	480709	A1P1 CERT
OSB-3C-3-MP	Metals	1350679	480749	A1P1 CERT
OSB-3C-3-MP	PCBs	1350679	480749	A1P1 CERT
OSB-3C-3-R	Primary Rad	1350679	480749	A1P1 CERT
OSB-3C-4-MP	Metals	1350698	480724	A1P1 CERT
OSB-3C-4-MP	PCBs	1350698	480724	A1P1 CERT
OSB-3C-4-RV	Primary Rad	1350698	480724	A1P1 CERT
OSB-3C-5-MP	Metals	1350596	480755	A1P1 CERT
OSB-3C-5-MP	PCBs	1350596	480755	A1P1 CERT
OSB-3C-5-R	Primary Rad	1350596	480755	A1P1 CERT
OSB-3C-6-MP	Metals	1350631	480800	A1P1 CERT
OSB-3C-6-MP	PCBs	1350631	480800	A1P1 CERT
OSB-3C-6-R	Primary Rad	1350631	480800	A1P1 CERT
OSB-3C-7-MP	Metals	1350654	480768	A1P1 CERT
OSB-3C-7-MP	PCBs	1350654	480768	A1P1 CERT
OSB-3C-7-R	Primary Rad	1350654	480768	A1P1 CERT
OSB-3C-8-MP	Metals	1350689	480779	A1P1 CERT
OSB-3C-8-MP	PCBs	1350689	480779	A1P1 CERT
OSB-3C-8-R	Primary Rad	1350689	480779	A1P1 CERT
OSB-3C-9-MP	Metals	1350603	480834	A1P1 CERT
OSB-3C-9-MP	PCBs	1350603	480834	A1P1 CERT
OSB-3C-9-R	Primary Rad	1350603	480834	A1P1 CERT

OSDF SEDIMENT BASIN
CERTIFICATION SAMPLES (continued)

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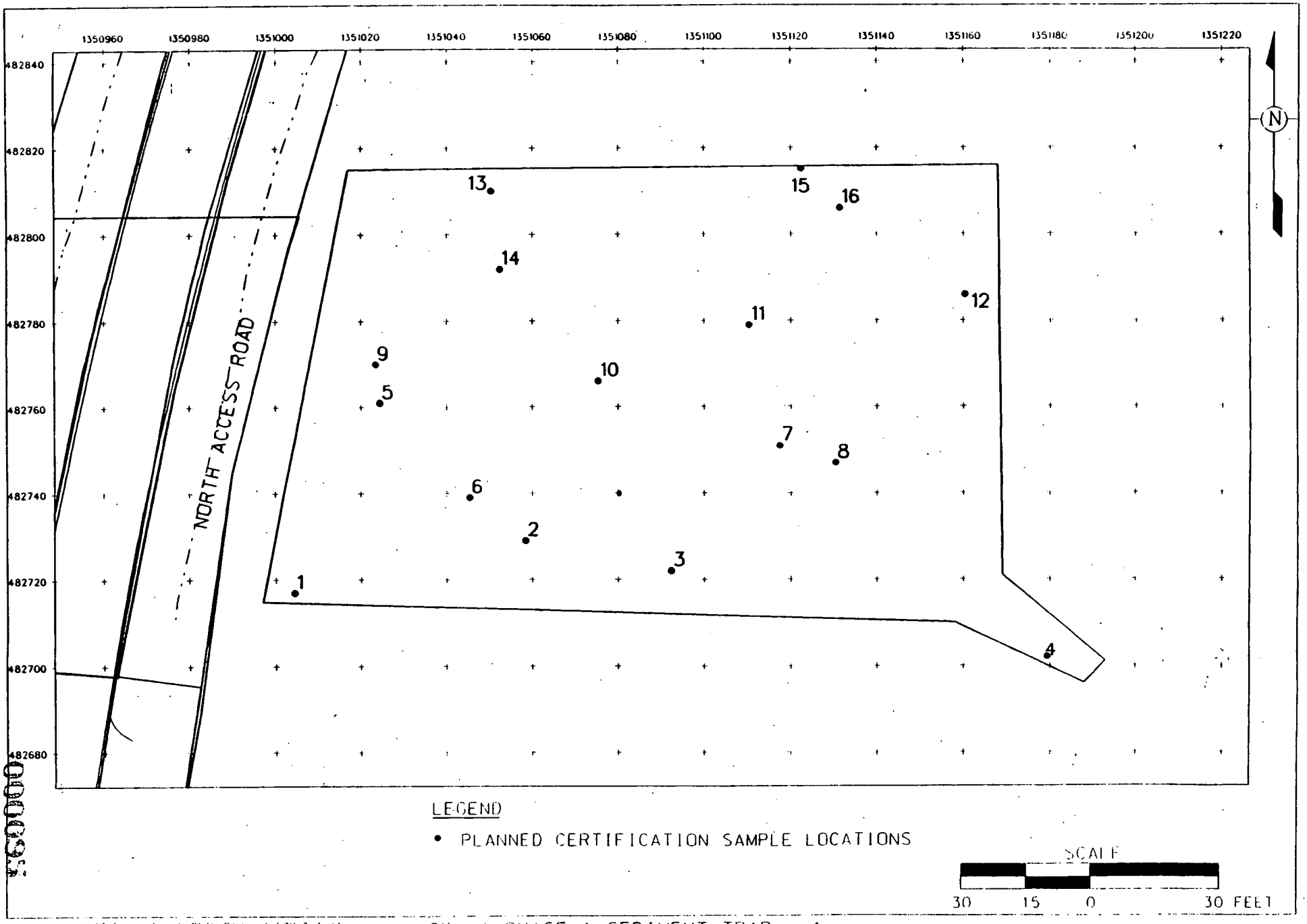
STATION NUMBE	SAMPLE TYPE	EASTING 83	NORTHING 83	AREA NAME
OSB-4C-1-MP	Metals	1350749	480884	A1P1 CERT
OSB-4C-1-MP	PCBs	1350749	480884	A1P1 CERT
OSB-4C-1-R	Primary Rad	1350749	480884	A1P1 CERT
OSB-4C-10-MP	Metals	1350765	481015	A1P1 CERT
OSB-4C-10-MP	PCBs	1350765	481015	A1P1 CERT
OSB-4C-10-R	Primary Rad	1350765	481015	A1P1 CERT
OSB-4C-11-MP	Metals	1350806	481025	A1P1 CERT
OSB-4C-11-MP	PCBs	1350806	481025	A1P1 CERT
OSB-4C-11-R	Primary Rad	1350806	481025	A1P1 CERT
OSB-4C-12-MP	Metals	1350835	481015	A1P1 CERT
OSB-4C-12-MP	PCBs	1350835	481015	A1P1 CERT
OSB-4C-12-RV	Primary Rad	1350835	481015	A1P1 CERT
OSB-4C-13-MP	Metals	1350719	481101	A1P1 CERT
OSB-4C-13-MP	PCBs	1350719	481101	A1P1 CERT
OSB-4C-13-R	Primary Rad	1350719	481101	A1P1 CERT
OSB-4C-14-MP	Metals	1350784	481073	A1P1 CERT
OSB-4C-14-MP	PCBs	1350784	481073	A1P1 CERT
OSB-4C-14-MP-DU	Metals	1350784	481073	A1P1 CERT
OSB-4C-14-R	Primary Rad	1350784	481073	A1P1 CERT
OSB-4C-14-R-DUP	Primary Rad	1350784	481073	A1P1 CERT
OSB-4C-15-MP	Metals	1350798	481106	A1P1 CERT
OSB-4C-15-MP	PCBs	1350798	481106	A1P1 CERT
OSB-4C-15-R	Primary Rad	1350798	481106	A1P1 CERT
OSB-4C-16-MP	Metals	1350850	481126	A1P1 CERT
OSB-4C-16-MP	PCBs	1350850	481126	A1P1 CERT
OSB-4C-16-R	Primary Rad	1350850	481126	A1P1 CERT
OSB-4C-2-MP	Metals	1350770	480875	A1P1 CERT
OSB-4C-2-MP	PCBs	1350770	480875	A1P1 CERT
OSB-4C-2-RV	Primary Rad	1350770	480875	A1P1 CERT
OSB-4C-3-MP	Metals	1350801	480933	A1P1 CERT
OSB-4C-3-MP	PCBs	1350801	480933	A1P1 CERT
OSB-4C-3-RV	Primary Rad	1350801	480933	A1P1 CERT
OSB-4C-4-MP	Metals	1350835	480898	A1P1 CERT
OSB-4C-4-MP	PCBs	1350835	480898	A1P1 CERT
OSB-4C-4-MP-DUP	Metals	1350835	480898	A1P1 CERT
OSB-4C-4-MP-DUP	PCBs	1350835	480898	A1P1 CERT
OSB-4C-4-R	Primary Rad	1350835	480898	A1P1 CERT
OSB-4C-4-R-DUP	Primary Rad	1350835	480898	A1P1 CERT
OSB-4C-5-MP	Metals	1350738	480955	A1P1 CERT
OSB-4C-5-MP	PCBs	1350738	480955	A1P1 CERT
OSB-4C-5-R	Primary Rad	1350738	480955	A1P1 CERT
OSB-4C-6-MP	Metals	1350759	480973	A1P1 CERT
OSB-4C-6-MP	PCBs	1350759	480973	A1P1 CERT
OSB-4C-6-R	Primary Rad	1350759	480973	A1P1 CERT
OSB-4C-7-MP	Metals	1350826	480991	A1P1 CERT
OSB-4C-7-MP	PCBs	1350826	480991	A1P1 CERT
OSB-4C-7-R	Primary Rad	1350826	480991	A1P1 CERT
OSB-4C-8-MP	Metals	1350852	480976	A1P1 CERT
OSB-4C-8-MP	PCBs	1350852	480976	A1P1 CERT
OSB-4C-8-RV	Primary Rad	1350852	480976	A1P1 CERT
OSB-4C-9-MP	Metals	1350734	481017	A1P1 CERT
OSB-4C-9-MP	PCBs	1350734	481017	A1P1 CERT
OSB-4C-9-R	Primary Rad	1350734	481017	A1P1 CERT

OSDF SEDIMENT BASIN
CERTIFICATION SAMPLES (continued)

3/4/97

STATION NUMBE	SAMPLE TYPE	EASTING 83	NORTHING 83	AREA NAME
OSB-5C-1-MP	Metals	1350612	480920	A1P1 CERT
OSB-5C-1-MP	PCBs	1350612	480920	A1P1 CERT
OSB-5C-1-R	Primary Rad	1350612	480920	A1P1 CERT
OSB-5C-10-MP	Metals	1350640	481027	A1P1 CERT
OSB-5C-10-MP	PCBs	1350640	481027	A1P1 CERT
OSB-5C-10-MP-DU	Metals	1350640	481027	A1P1 CERT
OSB-5C-10-MP-DU	PCBs	1350640	481027	A1P1 CERT
OSB-5C-10-R	Primary Rad	1350640	481027	A1P1 CERT
OSB-5C-10-R-DUP	Primary Rad	1350640	481027	A1P1 CERT
OSB-5C-11-MP	Metals	1350665	481046	A1P1 CERT
OSB-5C-11-MP	PCBs	1350665	481046	A1P1 CERT
OSB-5C-11-R	Primary Rad	1350665	481046	A1P1 CERT
OSB-5C-12-MP	Metals	1350703	481035	A1P1 CERT
OSB-5C-12-MP	PCBs	1350703	481035	A1P1 CERT
OSB-5C-12-R	Primary Rad	1350703	481035	A1P1 CERT
OSB-5C-13-MP	Metals	1350611	481110	A1P1 CERT
OSB-5C-13-MP	PCBs	1350611	481110	A1P1 CERT
OSB-5C-13-R	Primary Rad	1350611	481110	A1P1 CERT
OSB-5C-14-MP	Metals	1350646	481123	A1P1 CERT
OSB-5C-14-MP	PCBs	1350646	481123	A1P1 CERT
OSB-5C-14-R	Primary Rad	1350646	481123	A1P1 CERT
OSB-5C-15-MP	Metals	1350673	481080	A1P1 CERT
OSB-5C-15-MP	PCBs	1350673	481080	A1P1 CERT
OSB-5C-15-RV	Primary Rad	1350673	481080	A1P1 CERT
OSB-5C-16-MP	Metals	1350690	481085	A1P1 CERT
OSB-5C-16-MP	PCBs	1350690	481085	A1P1 CERT
OSB-5C-16-RV	Primary Rad	1350690	481085	A1P1 CERT
OSB-5C-2-MP	Metals	1350651	480959	A1P1 CERT
OSB-5C-2-MP	PCBs	1350651	480959	A1P1 CERT
OSB-5C-2-R	Primary Rad	1350651	480959	A1P1 CERT
OSB-5C-3-MP	Metals	1350663	480931	A1P1 CERT
OSB-5C-3-MP	PCBs	1350663	480931	A1P1 CERT
OSB-5C-3-R	Primary Rad	1350663	480931	A1P1 CERT
OSB-5C-4-MP	Metals	1350697	480935	A1P1 CERT
OSB-5C-4-MP	PCBs	1350697	480935	A1P1 CERT
OSB-5C-4-R	Primary Rad	1350697	480935	A1P1 CERT
OSB-5C-5-MP	Metals	1350622	481009	A1P1 CERT
OSB-5C-5-MP	PCBs	1350622	481009	A1P1 CERT
OSB-5C-5-R	Primary Rad	1350622	481009	A1P1 CERT
OSB-5C-6-MP	Metals	1350628	480974	A1P1 CERT
OSB-5C-6-MP	PCBs	1350628	480974	A1P1 CERT
OSB-5C-6-R	Primary Rad	1350628	480974	A1P1 CERT
OSB-5C-7-MP	Metals	1350666	481007	A1P1 CERT
OSB-5C-7-MP	PCBs	1350666	481007	A1P1 CERT
OSB-5C-7-RV	Primary Rad	1350666	481007	A1P1 CERT
OSB-5C-8-MP	Metals	1350709	481006	A1P1 CERT
OSB-5C-8-MP	PCBs	1350709	481006	A1P1 CERT
OSB-5C-8-R	Primary Rad	1350709	481006	A1P1 CERT
OSB-5C-9-MP	Metals	1350602	481062	A1P1 CERT
OSB-5C-9-MP	PCBs	1350602	481062	A1P1 CERT
OSB-5C-9-RV	Primary Rad	1350602	481062	A1P1 CERT



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PHASE 1 SEDIMENT TRAP - 1

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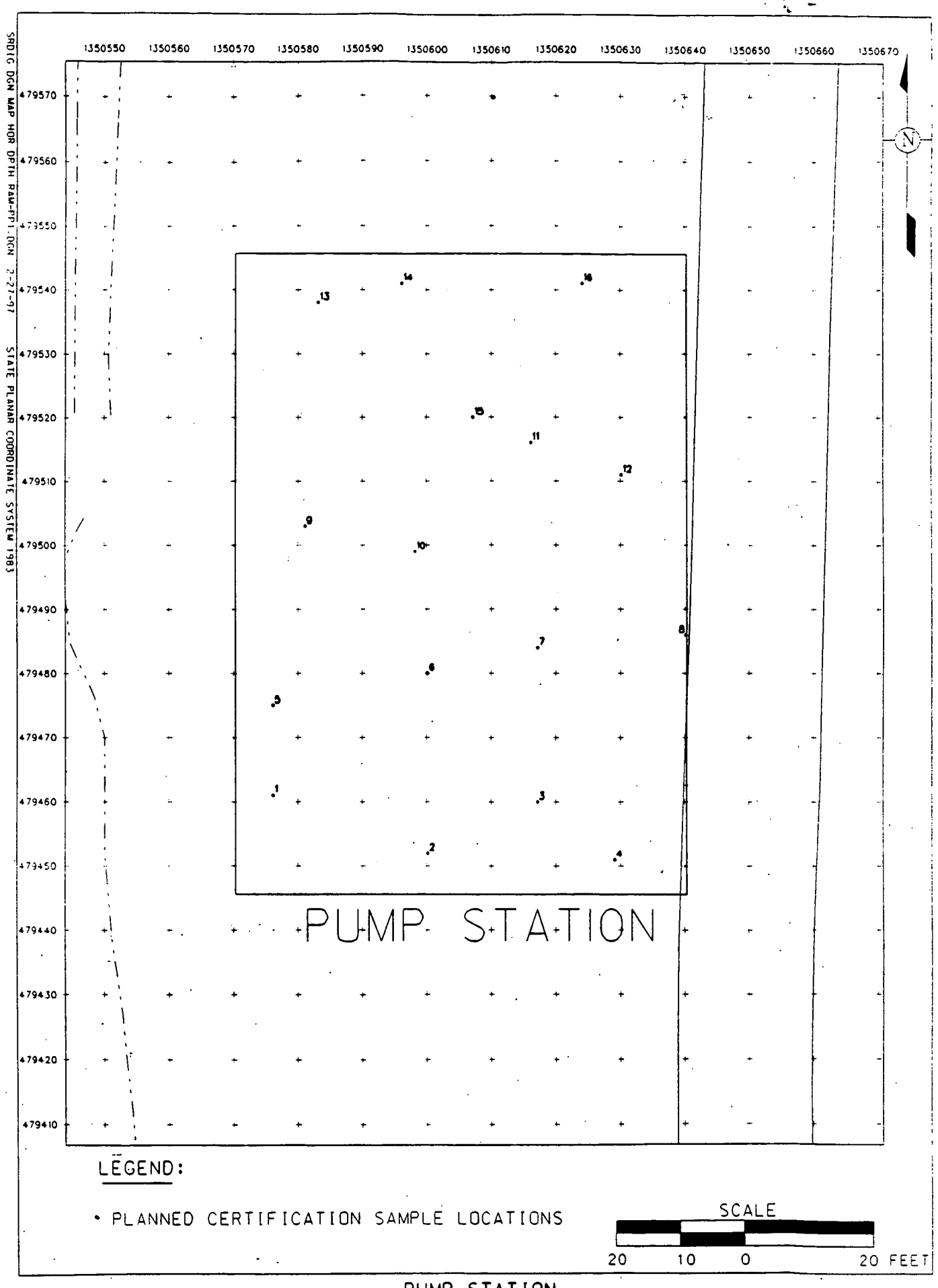
SEDIMENT TRAP #1
CERTIFICATION SAMPLES

3/4/97

STATION NUMBE	SAMPLE TYPE	EASTING 83	NORTHING 83	AREA NAME
A1P1ST1-10C-M	Metals	1351075	482766	A1P1 CERT
A1P1ST1-10C-R	Primary Rad	1351075	482766	A1P1 CERT
A1P1ST1-11C-MV	Metals	1351110	482779	A1P1 CERT
A1P1ST1-11C-RV	Primary Rad	1351110	482779	A1P1 CERT
A1P1ST1-12C-M	Metals	1351160	482786	A1P1 CERT
A1P1ST1-12C-R	Primary Rad	1351160	482786	A1P1 CERT
A1P1ST1-13C-M	Metals	1351050	482810	A1P1 CERT
A1P1ST1-13C-M-D	Metals	1351050	482810	A1P1 CERT
A1P1ST1-13C-R	Primary Rad	1351050	482810	A1P1 CERT
A1P1ST1-13C-R-D	Primary Rad	1351050	482810	A1P1 CERT
A1P1ST1-14C-MV	Metals	1351052	482792	A1P1 CERT
A1P1ST1-14C-RV	Primary Rad	1351052	482792	A1P1 CERT
A1P1ST1-15C-M	Metals	1351122	482815	A1P1 CERT
A1P1ST1-15C-R	Primary Rad	1351122	482815	A1P1 CERT
A1P1ST1-16C-M	Metals	1351131	482806	A1P1 CERT
A1P1ST1-16C-R	Primary Rad	1351131	482806	A1P1 CERT
A1P1ST1-1C-MV	Metals	1351004	482717	A1P1 CERT
A1P1ST1-1C-RV	Primary Rad	1351004	482717	A1P1 CERT
A1P1ST1-2C-M	Metals	1351058	482729	A1P1 CERT
A1P1ST1-2C-R	Primary Rad	1351058	482729	A1P1 CERT
A1P1ST1-3C-M	Metals	1351092	482722	A1P1 CERT
A1P1ST1-3C-R	Primary Rad	1351092	482722	A1P1 CERT
A1P1ST1-4C-M	Metals	1351179	482702	A1P1 CERT
A1P1ST1-4C-R	Primary Rad	1351179	482702	A1P1 CERT
A1P1ST1-5C-M	Metals	1351024	482761	A1P1 CERT
A1P1ST1-5C-RV	Primary Rad	1351024	482761	A1P1 CERT
A1P1ST1-6C-M	Metals	1351045	482739	A1P1 CERT
A1P1ST1-6C-R	Primary Rad	1351045	482739	A1P1 CERT
A1P1ST1-7C-M	Metals	1351117	482751	A1P1 CERT
A1P1ST1-7C-R	Primary Rad	1351117	482751	A1P1 CERT
A1P1ST1-8C-M	Metals	1351130	482747	A1P1 CERT
A1P1ST1-8C-R	Primary Rad	1351130	482747	A1P1 CERT
A1P1ST1-9C-M	Metals	1351023	482770	A1P1 CERT
A1P1ST1-9C-R	Primary Rad	1351023	482770	A1P1 CERT



PUMP STATION

PUMP STATION CERTIFICATION SAMPLES

3/4/97

STATION NUMBE	SAMPLE TYPE	EASTING 83	NORTHING 83	AREA NAME
PUMP1-C-1-MP	Metals	1350576	479461	A1P1 CERT
PUMP1-C-1-MP	PCBs	1350576	479461	A1P1 CERT
PUMP1-C-1-RS	Primary Rad	1350576	479461	A1P1 CERT
PUMP1-C-1-RS	Secondary Rad	1350576	479461	A1P1 CERT
PUMP1-C-10-MP	Metals	1350598	479499	A1P1 CERT
PUMP1-C-10-MP	PCBs	1350598	479499	A1P1 CERT
PUMP1-C-10-RS	Primary Rad	1350598	479499	A1P1 CERT
PUMP1-C-10-RS	Secondary Rad	1350598	479499	A1P1 CERT
PUMP1-C-11-MP	Metals	1350616	479516	A1P1 CERT
PUMP1-C-11-MP	PCBs	1350616	479516	A1P1 CERT
PUMP1-C-11-MP-D	Metals	1350616	479516	A1P1 CERT
PUMP1-C-11-MP-D	PCBs	1350616	479516	A1P1 CERT
PUMP1-C-11-RS	Primary Rad	1350616	479516	A1P1 CERT
PUMP1-C-11-RS	Secondary Rad	1350616	479516	A1P1 CERT
PUMP1-C-11-RS-D	Primary Rad	1350616	479516	A1P1 CERT
PUMP1-C-11-RS-D	Secondary Rad	1350616	479516	A1P1 CERT
PUMP1-C-12-MP	Metals	1350630	479511	A1P1 CERT
PUMP1-C-12-MP	PCBs	1350630	479511	A1P1 CERT
PUMP1-C-12-RS	Primary Rad	1350630	479511	A1P1 CERT
PUMP1-C-12-RS	Secondary Rad	1350630	479511	A1P1 CERT
PUMP1-C-13-MP	Metals	1350583	479538	A1P1 CERT
PUMP1-C-13-MP	PCBs	1350583	479538	A1P1 CERT
PUMP1-C-13-RS	Primary Rad	1350583	479538	A1P1 CERT
PUMP1-C-13-RS	Secondary Rad	1350583	479538	A1P1 CERT
PUMP1-C-14-MP	Metals	1350596	479541	A1P1 CERT
PUMP1-C-14-MP	PCBs	1350596	479541	A1P1 CERT
PUMP1-C-14-RS	Primary Rad	1350596	479541	A1P1 CERT
PUMP1-C-14-RS	Secondary Rad	1350596	479541	A1P1 CERT
PUMP1-C-15-MP	Metals	1350607	479520	A1P1 CERT
PUMP1-C-15-MP	PCBs	1350607	479520	A1P1 CERT
PUMP1-C-15-RS	Primary Rad	1350607	479520	A1P1 CERT
PUMP1-C-15-RS	Secondary Rad	1350607	479520	A1P1 CERT
PUMP1-C-16-MP	Metals	1350624	479541	A1P1 CERT
PUMP1-C-16-MP	PCBs	1350624	479541	A1P1 CERT
PUMP1-C-16-RS	Primary Rad	1350624	479541	A1P1 CERT
PUMP1-C-16-RS	Secondary Rad	1350624	479541	A1P1 CERT
PUMP1-C-2-MPV	Metals	1350600	479452	A1P1 CERT
PUMP1-C-2-MPV	PCBs	1350600	479452	A1P1 CERT
PUMP1-C-2-RSV	Primary Rad	1350600	479452	A1P1 CERT
PUMP1-C-2-RSV	Secondary Rad	1350600	479452	A1P1 CERT
PUMP1-C-3-MP	Metals	1350617	479460	A1P1 CERT
PUMP1-C-3-MP	PCBs	1350617	479460	A1P1 CERT
PUMP1-C-3-RS	Primary Rad	1350617	479460	A1P1 CERT
PUMP1-C-3-RS	Secondary Rad	1350617	479460	A1P1 CERT
PUMP1-C-4-MP	Metals	1350629	479451	A1P1 CERT
PUMP1-C-4-MP	PCBs	1350629	479451	A1P1 CERT
PUMP1-C-4-RS	Primary Rad	1350629	479451	A1P1 CERT
PUMP1-C-4-RS	Secondary Rad	1350629	479451	A1P1 CERT
PUMP1-C-5-MP	Metals	1350576	479475	A1P1 CERT
PUMP1-C-5-MP	PCBs	1350576	479475	A1P1 CERT
PUMP1-C-5-RS	Primary Rad	1350576	479475	A1P1 CERT
PUMP1-C-5-RS	Secondary Rad	1350576	479475	A1P1 CERT
PUMP1-C-6-MP	Metals	1350600	479480	A1P1 CERT
PUMP1-C-6-MP	PCBs	1350600	479480	A1P1 CERT
PUMP1-C-6-RSV	Primary Rad	1350600	479480	A1P1 CERT
PUMP1-C-6-RSV	Secondary Rad	1350600	479480	A1P1 CERT
PUMP1-C-7-MP	Metals	1350617	479484	A1P1 CERT
PUMP1-C-7-MP	PCBs	1350617	479484	A1P1 CERT
PUMP1-C-7-RS	Primary Rad	1350617	479484	A1P1 CERT
PUMP1-C-7-RS	Secondary Rad	1350617	479484	A1P1 CERT

3/4/97

PUMP STATION CERTIFICATION SAMPLES
(continued)

STATION NUMBE	SAMPLE TYPE	EASTING 83	NORTHING 83	AREA NAME
PUMP1-C-8-MPV	Metals	1350640	479486	A1P1 CERT
PUMP1-C-8-MPV	PCBs	1350640	479486	A1P1 CERT
PUMP1-C-8-RSV	Primary Rad	1350640	479486	A1P1 CERT
PUMP1-C-8-RSV	Secondary Rad	1350640	479486	A1P1 CERT
PUMP1-C-9-MPV	Metals	1350581	479503	A1P1 CERT
PUMP1-C-9-MPV	PCBs	1350581	479503	A1P1 CERT
PUMP1-C-9-RSV	Primary Rad	1350581	479503	A1P1 CERT
PUMP1-C-9-RSV	Secondary Rad	1350581	479503	A1P1 CERT

APPENDIX C

TARGET ANALYTE LISTS

TARGET ANALYTE LIST
AREA 1, PHASE I REMEDIAL ACTION WORK PLAN SAMPLING
Project Number 50.03.40.01

TAL A1PI - A

Bromopadap Method		
1		Total Uranium

WAC Sampling

Analytical Lead will provide guidance to the lab on sample drying requirements.

Printed: 4-March-97

TAL A1PI - B

TAL A1PI-B is not applicable to this PSP

TARGET ANALYTE LIST
AREA 1, PHASE I REMEDIAL ACTION WORK PLAN SAMPLING
Project Number 50.03.40.01

TAL A1PI - C

Gamma Spec Method		
1		Uranium - 235
2		Uranium - 238
3		Thorium - 228
4		Thorium - 232
5		Radium - 226
6		Radium - 228
7		Cesium - 137
8		Potassium - 40
Alpha Spec Method		
9		Thorium - 230
10		Thorium - 228
11		Thorium - 232

Certification Sampling

Printed: 4-March-97

TAL A1PI - D

TAL A1PI-D is not applicable to this PSP

TARGET ANALYTE LIST
AREA 1, PHASE I REMEDIAL ACTION WORK PLAN SAMPLING
Project Number 50.03.40.01

TAL A1PI - E

Metals		
1		Aluminum
2		Arsenic
3		Beryllium
4		Manganese
5		Molybdenum

Certification Sampling

Printed: 4-March-97

TAL A1PI - F

TAL A1PI-F is not applicable to this PSP

TARGET ANALYTE LIST
AREA 1, PHASE I REMEDIAL ACTION WORK PLAN SAMPLING
Project Number 50.03.40.01

TAL A1PI - G

Metals		
1		Arsenic
Radiological		
2		Total Uranium

Equipment Rinsate Samples (Certification Sampling)

Printed: 4-March-97

TARGET ANALYTE LIST
AREA 1, PHASE I REMEDIAL ACTION WORK PLAN SAMPLING
Project Number 50.03.40.01

TAL A1PI - H

Gamma Spec Method		
1		Uranium - 235
2		Uranium - 238
3		Thorium - 228
4		Thorium - 232
5		Radium - 226
6		Radium - 228
7		Potassium - 40
Alpha Spec Method		
8		Thorium - 228
9		Thorium - 232

Certification Sampling

Printed: 4-March-97

TARGET ANALYTE LIST
AREA 1, PHASE I REMEDIAL ACTION WORK PLAN SAMPLING
Project Number 50.03.40.01

TAL A1PI - I

Metals		
1.		Aluminum
2		Arsenic
3		Beryllium
4		Lead
5		Manganese
6		Molybdenum
PCB		
7		Aroclor-1260
8		Aroclor-1254

Certification Sampling

APPENDIX D

FINAL SOIL CERTIFICATION SAMPLE ALPHA, BETA, ANALYSIS SUPPORT EXEMPTION

FLUOR DANIEL FERNALD

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INTEROFFICE MEMORANDUM

To:	Project Files, MS52-7	Date:	October 9, 1996
Location:	Fernald	Reference:	
From:	Keith Nelson, MS52-5	FERMCO #:	M:SWP(SCEP):96-0011
Location:	Fernald	Client:	DOE DE-AC24-92OR21972
Extension:	648-5270	Subject:	**FINAL SOIL CERTIFICATION SAMPLE ALPHA, BETA ANALYSIS EXEMPTION**

c: File Record Storage Copy 106.4.34.5

Final soil certification samples transported from the FEMP to offsite laboratories will not require alpha, beta screening analysis to ensure compliance with DOT regulations for Department of Transportation (DOT) labeling. The Area 1, Phase I Remedial Action Work Plan for the Soil Remediation Project was determined to generate sufficient information in the form of field screening activities and precertification testing to assure Fluor Daniel Fernald that certification samples contain radioactivity less than the final remediation levels (FRLs). Final soil certification samples will contain far less than the 0.002 μCi/g DOT threshold and are therefore not considered radioactive material in accordance with 49 CFR 173.403.

Concurrence:

10/30/96
Soils Project

10/30/96
Radiological Control

KAN:dsm

FS-F-3934 (8/31/95)

000111

APPENDIX E

QUALITY CONTROL SAMPLE TYPES AND FREQUENCIES

APPENDIX E

QUALITY CONTROL SAMPLE TYPES AND FREQUENCIES

SAMPLE TYPE	ASL LEVEL B	ASL LEVEL C,D & E
Reagent Blank	1/20 or 1/batch(1)	1/20 or 1/batch(1)
Laboratory Control Sample[2,4]	1/20 or 1/batch(1)	1/20 or 1/batch(1)
Duplicate	N/A	1/20 or 1/batch(1) per matrix
Matrix Spike[4]	U-Total only	1/20 or 1/batch(1) per matrix
Tracer or carrier or spike[3]	each sample	each sample

Notes:

MSD - Matrix Spike Duplicate

ASL - Analytical Support Level (See SCQ for more detail.)

(1) - One per 20 or 1 per batch, whichever is more frequent.

(2) - The LCS shall include at least one radioisotope from those being analyzed when using alpha and gamma counting techniques.

(3) - When a tracer or carrier is not used to determine chemical recovery, a spiked duplicate must be analyzed concurrently with each sample. A sample specific chemical recovery monitor (either a tracer, carrier, or spike) must be used for each sample being analyzed by a method which involves chemical separation. The use of batch efficiency or batch recovery factors is not acceptable. The only exceptions to this requirement are gross alpha, gross beta, direct gamma spectrometry methods that do not involve chemical separations, and chemical uranium (U-Total) measurements.

(4) - For low level samples where the Radiochemical Analysis Performance Specifications of Attachment 2 apply, the MS and LCS activities must be no more than 50 times the required HAMDC.

APPENDIX F

RADIOCHEMICAL ANALYSIS PERFORMANCE SPECIFICATIONS ANALYTICAL SUPPORT LEVELS (ASL) D*

APPENDIX F

RADIOCHEMICAL ANALYSIS PERFORMANCE SPECIFICATIONS
ANALYTICAL SUPPORT LEVELS (ASL) D*

ANALYTE: U-234, U-235/236, U-238 (Alpha Isotopic and Gamma)

	SAMPLE MATRIX				
PERFORMANCE PARAMETERS	WATER	SOIL/ SEDIMENT	AIR FILTERS (2)	FLY ASH	CONTAMINATED LIQUID(3)
Highest Allowable Minimum Detectable Concentration (HAMDC) (1)	0.2 pCi/L	8 pCi/g	4.0 pCi/Filter	0.2 pCi/g	0.5 pCi/L
Percent Overall Tracer/Chemical Recovery (6)	50-100%	45-100%	45-100%	45-100%	45-100%
Percent Matrix Spike Recovery (6)	50-100%	45-100%	45-100%	45-100%	45-100%
Method Blank Concentration	<HAMDC(4)	<HAMDC(4)	<HAMDC(4)	<HAMDC(4)	<HAMDC(4)
Laboratory Control Sample: Percent of Known Value (6)	85-115%	85-115%	85-115%	85-115%	85-115%
Precision Requirements for Duplicate Samples	RER≤2(5)	RER≤2(5)	RER≤2(5)	RER≤2(5)	RER≤2(5)

(1) $MDC = \frac{4.65\ SBLK}{K} + \frac{2.71}{T \times K}$

Where SBLK is the standard deviation of the count rate of an appropriate method blank and, K is the correction factor that includes units conversion and typical values for the volume or weight of sample, decay correction factor, detector efficiency and the chemical recovery. T is the counting time of the sample.

(2) Glass Fiber 8" X 10".

(3) Two phase system containing 90% Water + 10% Organic liquid.

(4) Less than HAMDC or 5% of sample concentration whichever is greater.

(5) Relative Error Ratio, $RER = |C_1 - C_2| / [(TPU_1)^2 + (TPU_2)^2]^{1/2}$ where C_1 and C_2 are the measured concentrations for the sample and duplicate and TPU_1 and TPU_2 are the respective total propagated uncertainties. Measurements are acceptable if RER ≤ 2. If RER is greater than 2 but less than or equal to 3, investigate the cause and take corrective action if RER is consistently greater than 2. If RER > 3, take corrective actions and reanalyze the batch of samples.

(6) Recoveries or percentages of known values which are 15% above or below the ranges listed are acceptable on an infrequent basis, i.e., less than 15% of the time. These occurrences must be investigated and explained. If more than 15% of the recoveries are outside the ranges listed, take corrective actions and reanalyze the batch of samples.

Note: Radiochemical analyses are designated as ASL D* due to the use of methods and QA/QC standards from the FEMP Sitewide CERCLA Quality Assurance Project Plan with modifications made to tailor the detection limits to the project.

RADIOCHEMICAL ANALYSIS PERFORMANCE SPECIFICATIONS
ANALYTICAL SUPPORT LEVELS (ASL) D*

ANALYTE: Th-228, 230, 232 (Alpha Isotopic and Gamma)

	SAMPLE MATRIX				
PERFORMANCE PARAMETERS	**WATER**	**SOIL/ SEDIMENT**	**AIR FILTERS (2)**	**FLY ASH**	**CONTAMINATED LIQUID (3)**
Highest Allowable Minimum Detectable Concentration (HAMDC) (1)	0.2 pCi/L	0.5 pCi/g	4.0 pCi/Filter	0.2 pCi/g	0.5 pCi/L
Percent Overall Tracer/Chemical Recovery (6)	50-100%	45-100%	45-100%	45-100%	45-100%
Percent Matrix Spike Recovery (6)	50-100%	45-100%	45-100%	45-100%	45-100%
Method Blank Concentration	<HAMDC(4)	<HAMDC(4)	<HAMDC(4)	<HAMDC(4)	<HAMDC(4)
Laboratory Control Sample: Percent of Known Value (6)	85-115%	85-115%	85-115%	85-115%	85-115%
Precision Requirements for Duplicate Samples	RER≤2(5)	RER≤2(5)	RER≤2(5)	RER≤2(5)	RER≤2(5)

(1) $MDC = \frac{4.65\ S_{BLK}}{K} + \frac{2.71}{T \times K}$

Where S_{BLK} is the standard deviation of the count rate of an appropriate method blank and, K is the correction factor that includes units conversion and typical values for the volume or weight of sample, decay correction factor, detector efficiency and the chemical recovery. T is the counting time of the sample.

(2) Glass Fiber 8" X 10".

(3) Two phase system containing 90% Water + 10% Organic liquid.

(4) When the concentration of a radionuclide in a sample is significantly greater than the applicable HAMDC, the Radiochemical Analysis Performance Specifications for the HAMDC and Method Blank Concentration are waived. Counts may be terminated earlier than usual provided that the one sigma uncertainty in the net count rate of the sample(s) is ten percent (10%) or less. The measured result for the blank must not exceed five percent (5%) of the activity concentration of the least active sample in the batch.

(5) Relative Error Ratio, $RER = |C_1 - C_2| / \{(TPU_1)^2 + (TPU_2)^2\}^{1/2}$ where C_1 and C_2 are the measured concentrations for the sample and duplicate and TPU_1 and TPU_2 are the respective total propagated uncertainties. Measurements are acceptable if RER ≤ 2. If RER is greater than 2 but less than or equal to 3, investigate the cause and take corrective action if RER is consistently greater than 2. If RER > 3, take corrective actions and reanalyze the batch of samples.

(6) Recoveries or percentages of known values which are 15% above or below the ranges listed are acceptable on an infrequent basis, i.e., less than 15% of the time. These occurrences must be investigated and explained. If more than 15% of the recoveries are outside the ranges listed, take corrective actions and reanalyze the batch of samples.

Note: Radiochemical analyses are designated as ASL D* due to the use of methods and QA/QC standards from the FEMP Sitewide CERCLA Quality Assurance Project Plan with modifications made to tailor the detection limits to the project.

APPENDIX F

RADIOCHEMICAL ANALYSIS PERFORMANCE SPECIFICATIONS
ANALYTICAL SUPPORT LEVELS (ASL) D*

ANALYTE: Ra-226 by Gamma Spectrometry

PERFORMANCE PARAMETERS	SAMPLE MATRIX				
	WATER	SOIL/ SEDIMENT	AIR FILTERS (2)	FLY ASH	CONTAMINATED LIQUID (3)
Highest Allowable Minimum Detectable Concentration (HAMDC) (1)	1.0 pCi/L	0.8 pCi/g	2.0 pCi/Filter	0.5 pCi/g	2.0 pCi/L
Percent Overall Tracer/Chemical Recovery (6)	50-100%	45-100%	45-100%	45-100%	45-100%
Percent Matrix Spike Recovery (6)	75-125%	65-130%	65-130%	65-130%	65-130%
Method Blank Concentration	<HAMDC(4)	<HAMDC(4)	<HAMDC(4)	<HAMDC(4)	<HAMDC(4)
Laboratory Control Sample: Percent of Known Value (6)	75-125%	75-125%	75-125%	75-125%	75-125%
Precision Requirements for Duplicate Samples	RER≤2(5)	RER≤2(5)	RER≤2(5)	RER≤2(5)	RER≤2(5)

(1) $MDC = \frac{4.65\ S_{BLK}}{K} + \frac{2.71}{T \times K}$

Where S_{BLK} is the standard deviation of the count rate of an appropriate method blank and, K is the correction factor that includes units conversion and typical values for the volume or weight of sample, decay correction factor, detector efficiency and the chemical recovery. T is the counting time of the sample.

(2) Glass Fiber 8" X 10".

(3) Two phase system containing 90% Water + 10% Organic liquid.

(4) When the concentration of a radionuclide in a sample is significantly greater than the applicable HAMDC, the Radiochemical Analysis Performance Specifications for the HAMDC and Method Blank Concentration are waived. Counts may be terminated earlier than usual provided that the one sigma uncertainty in the net count rate of the sample(s) is ten percent (10%) or less. The measured result for the blank must not exceed five percent (5%) of the activity concentration of the least active sample in the batch.

(5) Relative Error Ratio, $RER = |C_1 - C_2| / [(TPU_1)^2 + (TPU_2)^2]^{1/2}$ where C_1 and C_2 are the measured concentrations for the sample and duplicate and TPU_1 and TPU_2 are the respective total propagated uncertainties. Measurements are acceptable if RER ≤ 2. If RER is greater than 2 but less than or equal to 3, investigate the cause and take corrective action if RER is consistently greater than 2. If RER > 3, take corrective actions and reanalyze the batch of samples.

(6) Recoveries or percentages of known values which are 15% above or below the ranges listed are acceptable on an infrequent basis, i.e., less than 15% of the time. These occurrences must be investigated and explained. If more than 15% of the recoveries are outside the ranges listed, take corrective actions and reanalyze the batch of samples.

Note: Radiochemical analyses are designated as ASL D* due to the use of methods and QA/QC standards from the FEMP Sitewide CERCLA Quality Assurance Project Plan with modifications made to tailor the detection limits to the project.

RADIOCHEMICAL ANALYSIS PERFORMANCE SPECIFICATIONS
ANALYTICAL SUPPORT LEVELS (ASL) D*

ANALYTE: Ra-228 by Gamma Spectrometry

	SAMPLE MATRIX				
PERFORMANCE PARAMETERS	WATER	SOIL/ SEDIMENT	AIR FILTERS (2)	FLY ASH	CONTAMINATED LIQUID (3)
Highest Allowable Minimum Detectable Concentration (HAMDC) (1)	3.0 pCi/L	0.8 pCi/g	5.0 pCi/Filter	1.0 pCi/g	3.0 pCi/L
Percent Overall Tracer/Chemical Recovery (6)	50-100%	45-100%	45-100%	45-100%	45-100%
Percent Matrix Spike Recovery (6)	70-125%	60-130%	60-130%	60-130%	60-130%
Method Blank Concentration	<HAMDC(4)	<HAMDC(4)	<HAMDC(4)	<HAMDC(4)	<HAMDC(4)
Laboratory Control Sample: Percent of Known Value (6)	75-125%	75-125%	75-125%	75-125%	75-125%
Precision Requirements for Duplicate Samples	RER≤2(5)	RER≤2(5)	RER≤2(5)	RER≤2(5)	RER≤2(5)

(1) $MDC = \frac{4.65\ S_{BLK}}{K} + \frac{2.71}{T \times K}$

Where S_{BLK} is the standard deviation of the count rate of an appropriate method blank and, K is the correction factor that includes units conversion and typical values for the volume or weight of sample, decay correction factor, detector efficiency and the chemical recovery. T is the counting time of the sample.

(2) Glass Fiber 8" X 10".

(3) Two phase system containing 90% Water + 10% Organic liquid.

(4) When the concentration of a radionuclide in a sample is significantly greater than the applicable HAMDC, the Radiochemical Analysis Performance Specifications for the HAMDC and Method Blank Concentration are waived. Counts may be terminated earlier than usual provided that the one sigma uncertainty in the net count rate of the sample(s) is ten percent (10%) or less. The measured result for the blank must not exceed five percent (5%) of the activity concentration of the least active sample in the batch.

(5) Relative Error Ratio, $RER = |C_1 - C_2| / [(TPU_1)^2 + (TPU_2)^2]^{1/2}$ where C_1 and C_2 are the measured concentrations for the sample and duplicate and TPU_1 and TPU_2 are the respective total propagated uncertainties. Measurements are acceptable if RER ≤ 2. If RER is greater than 2 but less than or equal to 3, investigate the cause and take corrective action if RER is consistently greater than 2. If RER > 3, take corrective actions and reanalyze the batch of samples.

(6) Recoveries or percentages of known values which are 15% above or below the ranges listed are acceptable on an infrequent basis, i.e., less than 15% of the time. These occurrences must be investigated and explained. If more than 15% of the recoveries are outside the ranges listed, take corrective actions and reanalyze the batch of samples.

Note: Radiochemical analyses are designated as ASL D* due to the use of methods and QA/QC standards from the FEMP Sitewide CERCLA Quality Assurance Project Plan with modifications made to tailor the detection limits to the project.

RADIOCHEMICAL ANALYSIS PERFORMANCE SPECIFICATIONS
ANALYTICAL SUPPORT LEVEL (ASL) D*

ANALYTE: Cs-137 by Gamma Spectrometry

PERFORMANCE PARAMETERS	SAMPLE MATRIX				
	WATER	SOIL/ SEDIMENT	AIR FILTERS (2)	FLY ASH	CONTAMINATED LIQUID (3)
Highest Allowable Minimum Detectable Concentration (HAMDC) (1)	4.0 pCi/L	0.5 pCi/g	10 pCi/Filter	1.0 pCi/g	10 pCi/L
Percent Overall Tracer/Chemical Recovery (6)	N/A	N/A	N/A	N/A	N/A
Percent Matrix Spike Recovery (6)	N/A	N/A	N/A	N/A	N/A
Method Blank Concentration	<HAMDC(4)	<HAMDC(4)	<HAMDC(4)	<HAMDC(4)	<HAMDC(4)
Laboratory Control Sample: Percent of Known Value (6)	85-115%	80-120%	80-120%	80-120%	80-120%
Precision Requirements for Duplicate Samples	RER≤2(5)	RER≤2(5)	RER≤2(5)	RER≤2(5)	RER≤2(5)

(1) $MDC = \frac{4.65\ S_{BLK}}{K} + \frac{2.71}{T \times K}$

Where S_{BLK} is the standard deviation of the count rate of an appropriate method blank and, K is the correction factor that includes units conversion and typical values for the volume or weight of sample, decay correction factor, detector efficiency and the chemical recovery. T is the counting time of the sample.

(2) Glass Fiber 8" X 10".

(3) Two phase system containing 90% Water + 10% Organic liquid.

(4) Less than HAMDC or 5% of sample concentration whichever is greater.

(5) Relative Error Ratio, $RER = |C_1 - C_2| / [(TPU_1)^2 + (TPU_2)^2]^{1/2}$ where C_1 and C_2 are the measured concentrations for the sample and duplicate and TPU_1 and TPU_2 are the respective total propagated uncertainties. Measurements are acceptable if RER ≤ 2. If RER is greater than 2 but less than or equal to 3, investigate the cause and take corrective action if RER is consistently greater than 2. If RER > 3, take corrective actions and reanalyze the batch of samples.

(6) Recoveries or percentages of known values which are 15% above or below the ranges listed are acceptable on an infrequent basis, i.e., less than 15% of the time. These occurrences must be investigated and explained. If more than 15% of the recoveries are outside the ranges listed, take corrective actions and reanalyze the batch of samples.

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RADIOCHEMICAL ANALYSIS PERFORMANCE SPECIFICATIONS
ANALYTICAL SUPPORT LEVEL (ASL) D*

ANALYTE: K-40 by Gamma Spectrometry

PERFORMANCE PARAMETERS	SAMPLE MATRIX				
	WATER	SOIL/ SEDIMENT	AIR FILTERS (2)	FLY ASH	CONTAMINATED LIQUID (3)
Highest Allowable Minimum Detectable Concentration (HAMDC) (1)	4.0 pCi/L	2 pCi/g	10 pCi/Filter	1.0 pCi/g	10 pCi/L
Percent Overall Tracer/Chemical Recovery (6)	N/A	N/A	N/A	N/A	N/A
Percent Matrix Spike Recovery (6)	N/A	N/A	N/A	N/A	N/A
Method Blank Concentration	<HAMDC(4)	<HAMDC(4)	<HAMDC(4)	<HAMDC(4)	<HAMDC(4)
Laboratory Control Sample: Percent of Known Value (6)	85-115%	80-120%	80-120%	80-120%	80-120%
Precision Requirements for Duplicate Samples	RER≤2(5)	RER≤2(5)	RER≤2(5)	RER≤2(5)	RER≤2(5)

(1) $MDC = \frac{4.65\ S_{BLK}}{K} + \frac{2.71}{T \times K}$

Where S_{BLK} is the standard deviation of the count rate of an appropriate method blank and, K is the correction factor that includes units conversion and typical values for the volume or weight of sample, decay correction factor, detector efficiency and the chemical recovery. T is the counting time of the sample.

(2) Glass Fiber 8" X 10".

(3) Two phase system containing 90% Water + 10% Organic liquid.

(4) Less than HAMDC or 5% of sample concentration whichever is greater.

(5) Relative Error Ratio, $RER = |C_1 - C_2| / [(TPU_1)^2 + (TPU_2)^2]^{1/2}$ where C_1 and C_2 are the measured concentrations for the sample and duplicate and TPU_1 and TPU_2 are the respective total propagated uncertainties. Measurements are acceptable if RER ≤ 2. If RER is greater than 2 but less than or equal to 3, investigate the cause and take corrective action if RER is consistently greater than 2. If RER > 3, take corrective actions and reanalyze the batch of samples.

(6) Recoveries or percentages of known values which are 15% above or below the ranges listed are acceptable on an infrequent basis, i.e., less than 15% of the time. These occurrences must be investigated and explained. If more than 15% of the recoveries are outside the ranges listed, take corrective actions and reanalyze the batch of samples.

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RADIOCHEMICAL ANALYSIS PERFORMANCE SPECIFICATIONS
ANALYTICAL SUPPORT LEVEL (ASL) D*

ANALYTE: U-Total (Pulsed Laser Phosphorimetry)

PERFORMANCE PARAMETERS	SAMPLE MATRIX				
	WATER	SOIL/ SEDIMENT	AIR FILTERS (2)	FLY ASH	CONTAMINATED LIQUID (3)
Highest Allowable Minimum Detectable Concentration (HAMDC) (1)	0.1 μg/L	1 μg/g	2.0 μg/Filter	0.1 μg/g	1.0 μg/L
Percent Overall Tracer/Chemical Recovery (6)	N/A	N/A	N/A	N/A	N/A
Percent Matrix Spike Recovery (6)	75-125%	70-130%	70-130%	70-130%	70-130%
Method Blank Concentration	<HAMDC(4)	<HAMDC(4)	<HAMDC(4)	<HAMDC(4)	<HAMDC(4)
Laboratory Control Sample: Percent of Known Value (6)	75-125%	75-125%	75-125%	75-125%	75-125%
Precision Requirements for Duplicate Samples	RER≤2(5)	RER≤2(5)	RER≤2(5)	RER≤2(5)	RER≤2(5)

(1) $MDC = \frac{4.65\ S_{BLK}}{K}$

Where S_{BLK} is the standard deviation of the count rate of an appropriate method blank and, K is the correction factor that includes units conversion, typical values for the volume or weight of sample, dilution factor, etc.

(2) Glass Fiber 8" X 10".

(3) Two phase system containing 90% Water + 10% Organic liquid.

(4) When the uranium concentration in a sample is significantly greater than the applicable HAMDC, the Radiochemical Analysis Performance Specifications for the HAMDC and Method Blank Concentration are waived. In such instances, the sample specific MDC(s) must not exceed fifty percent (50%) of the sample concentration and the measured blank concentration must not exceed the HAMDC or five percent (5%) of the measured concentration of the sample in the batch with the lowest uranium concentration, whichever is greater.

(5) Relative Error Ratio, $RER = |C_1 - C_2| / [(TPU_1)^2 + (TPU_2)^2]^{1/2}$ where C_1 and C_2 are the measured concentrations for the sample and duplicate and TPU_1 and TPU_2 are the respective total propagated uncertainties. Measurements are acceptable if RER ≤ 2. If RER is greater than 2 but less than or equal to 3, investigate the cause and take corrective action if RER is consistently greater than 2. If RER > 3, take corrective actions and reanalyze the batch of samples.

(6) Recoveries or percentages of known values which are 15% above or below the ranges listed are acceptable on an infrequent basis, i.e., less than 15% of the time. These occurrences must be investigated and explained. If more than 15% of the recoveries are outside the ranges listed, take corrective actions and reanalyze the batch of samples.

Note: Radiochemical analyses are designated as ASL D* due to the use of methods and QA/QC standards from the FEMP Sitewide CERCLA Quality Assurance Project Plan with modifications made to tailor the detection limits to the project.